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REVIEW OF THE WORK OF THE ROYAL BOTANIC GARDENS, KEW, DURING 1952.

General

The Director was again nominated Vice-President of the Royal Society.

He has been awarded the Victoria Medal in Horticulture by the Royal Horticultural Society.

He has continued to serve as Vice-Chairman of the Agricultural Improvement Council and has been nominated by the Minister of Agriculture as a member of the newly constituted Governing Body of Glasshouse Research.

The Director has been appointed a member of the General Advisory Council of the B.B.C.

The Director resigned his position as Fullerton Professor of Physiology at the Royal Institution last July, having already served for five years.

At the request of the South African Association for the Advancement of Science, the British Association was invited to appoint the Director as their Biological delegate to the Jubilee Celebrations of the S.A.A.A.S. The Director and Sir Lawrence Bragg, F.R.S., the other delegate, reached Cape Town on July 3rd. The opportunity was taken of visiting the Bolus Herbarium, the Museum Herbarium at Cape Town, the Botanical Gardens and Herbarium at Kirstenbosch and the Herbaria at Pretoria and Johannesburg. The Director was invited to deliver a public lecture on Kew Gardens in Cape Town in connection with the Conference, before which he was the guest of honour at a Dinner given by the Royal Society of South Africa which was also celebrating its Jubilee. The Director lectured also at Kirstenbosch, Johannesburg and Potchefstroom. In view of the consideration which was being given to the establishment of a Botanic Garden in Johannesburg, the Director was invited to address a special meeting of the Johannesburg City Council on the subject of the objectives and organization of a botanical garden.

After the Congress the Director visited a number of botanically interesting areas including a four-day sojourn in the Kruger National Park.

The Director was indebted to the Vice-Chancellor of the University of Cape Town, to Professor Compton, Professor Adamson and Professor

Isaac, also to the Vice-Chancellor of the University of Johannesburg, to Professor Badenhuizen, Dr. Gilliland, Dr. Dyer, Mr. Van Balen and Dr. Reynolds, for their assistance with respect to scientific activities and to these and many others for hospitality and facilities of diverse kinds. He returned to England on August 22nd.

At the International Horticultural Congress in September, the Director presided at one of the Sessions and contributed the opening paper at another.

The Herbarium

The output of normal activities during 1952 is indicated by the following figures :—

Specimens received for the Herbarium 44,924, excluding those prepared from living material ; received on loan 5,120 ; sent on loan 6,990 ; distributed as duplicates 12,407 ; sheets mounted, 40,394 (excluding Algae, Fungi and Bryophyta).

Laying in has, in all departments, approximately kept up with the number of sheets mounted.

Visits by botanists numbered 4,010. In addition there were 290 visitors on the 10th May, when students, teachers, members of scientific societies and others, specially invited by the Director were conducted in groups round the Gardens, the Herbarium, and the Library and were entertained in the Herbarium. Many overseas botanists worked in the Herbarium during 1952, some of them for extended periods.

Several evening lectures were given by visiting botanists to members of the staff and guests. They were illustrated by slides or cinematograph and were much appreciated.

Members of the Kew Guild met at the Herbarium on 30 August for tea, after the Annual General Meeting and were later shown round the Herbarium and Library.

During the year a total of 2,673 enquiries and plant consignments has been dealt with.

Members of the scientific staff continue to be indebted to Mr. W. C. Worsdell for assistance in the translation of papers from various foreign languages and to Miss M. M. Whiting who has again given valuable voluntary service in re-arranging material from Tropical Asia.

Europe, Orient and N. Africa. In addition to routine naming of small collections and replying to numerous queries the following major tasks have been undertaken or completed during the year :

Mr. R. D. Meikle has now examined more than half of the plants collected by Major Platt on the island of Chios, 1939–40 ; and it is hoped that an account of the Chios flora will be ready for publication early in the coming year.

Mr. R. A. Blakelock continues work on the flora of Iraq, especially the collections of H. Field, Yussef Lazar, H. F. Mooney, G. Chapman and J. B. Gillett. He has also examined a small but interesting collection of plants brought from Afghanistan by Mr. E. Pierson.

An account of *Artemisia norvegica* Fries, recently found in Scotland by Sir Christopher Cox, has been prepared by Mr. Blakelock for the Kew

Bulletin. He is also revising *Celastraceae* and *Hippocrateaceae* for the " Flora of Tropical East Africa " and continuing his research on the Tree Senecios (subgenus *Dendrosenecio*).

Miss P. Lewis is now preparing part III of the " Flora of Kuweit " and hopes to have this ready for publication shortly : part II of this Flora (compiled jointly by Miss Lewis and Mr. B. L. Burtt) has been published. Additional material from Tropical Arabia has been presented by Dr. H. B. Gilliland and Mr. G. Popov. Miss Lewis has also determined small collections from N. Africa and Greece, collected by A. M. Easton, A. G. Sapper and Dr. Goulimy.

Miss I. Blewett, assistant to the European department, has, recently re-arranged and indexed the large and difficult genera, *Trifolium*, *Thymus and Ulmus*, so as to be more readily available for consultation.

Miss P. A. Rawdon succeeded Mrs. Adler (Miss D. E. Wiltshire) as Assistant Experimental Officer in charge of the National *Dianthus* collection on July 14th, 1952, and immediately assumed the duties of checking *Dianthus* stocks in cultivation, collecting seed, preparing specimens for the Herbarium and superintending the replanning of the *Dianthus* collections in the Experimental ground. More than 300 stocks were transplanted by Mr. Mullins, gardener in charge of the collection. On October 1st, 1952, Mr. R. C. Carolin, B.Sc., A.R.C.S., came to Kew on a D.S.I.R. scholarship tenable for 2–3 years with the object of working on the cytology of *Dianthus* with particular reference to its application in the taxonomy of the genus, facilities for which will be provided in the Jodrell laboratory.

A very valuable collection of European and N. African plants collected by Thomas Birch Wolfe during the mid-nineteenth century has been presented on permanent loan by the Trustees of the Ipswich Museum, where the specimens had been kept for more than seventy years. The specimens are well chosen and in very good condition, and will be a very useful addition to the Kew collections.

In addition to the above, valuable collections have been received during the course of the year from Miss Helen Crookshank (Baluchistan), Mr. P. H. Davis (Middle East and Turkey), Dr. H. B. Gilliland (Middle East), Mr. F. Merton (Cyprus), Dr. H. F. Mooney (Middle East), Mr. G. Popov (Arabia) and Mrs. F. M. Probyn (Cyprus). Useful and interesting British Isles material has come from Dr. R. W. Dennis (Shetlands), Mr. J. E. Lousley, Messrs. E. Milne-Redhead and V. S. Summerhayes (Isle of Man) and Dr. D. P. Young.

Northern Asia, China, Japan and Northern India. Selection and incorporation into the Kew Herbarium of material from the Hongkong and Greatrex herbaria has continued. Collections of Japanese plants received from the National Science Museum, Tokyo, on an exchange basis, and plants collected by R. R. Stewart in northern India received from New York Botanical Garden, have likewise been incorporated. In all 2,200 sheets have been mounted and laid into the herbarium.

The MS. of a revision of the genus *Camellia* is now ready for printing, Dr. Janaki Ammal has made chromosome counts of most of the *Camellia* species in cultivation, specimens of the material used have been incorporated in the herbarium.

As usual enquiries, mostly concerning cultivated plants and often involving appreciable investigation have absorbed a very considerable amount of time.

60 packets of seeds collected in Korea in 1951 by Sgt. Moorcroft have been sown in the Herbarium Experimental Ground. Plants from 25 have been brought to the flowering stage, and material dried for the herbarium, in a few instances the plants have not yet yet flowered, while there has so far been no germination from 28 packets. Owing to lack of space it was not possible to sow seeds from another 127 packets retained here, and sowings will be made in 1953. The 30 or so packets sent to the Arboretum and Herbaceous departments have been sown, and germination has been reasonably good.

Tropical Asia. Further naming has been made of the large collection sent by the North Borneo Forestry Department in previous years, besides a small collection sent this year. Preparation of duplicates from this material has been resumed and some sets have been distributed.

The mounting and incorporation into the herbarium of the named collection of Malayan plants received from Singapore in 1947 was completed. A start has now been made on the large collection of duplicates sent from Bogor (Indonesia) in the last few years, including over 3,000 received this year.

Other collections received and incorporated include 500 numbers from the 1933 collection of Mr. L. J. Brass in Papua, presented by the New York Botanical Garden ; collections by Dr. J. Elbert (Lesser Sunda Islands), presented by Leiden, Mr. A. A. Bullock (Manipur), Rev. N. E. G. Cruttwell (Papua) and Mr. H. B. G. Garrett (Siam).

Co-operation with the Flora Malesiana continued by sending extensive loans to Leiden. The arrangement of Malaysian specimens in the Herbarium following the Flora Malesiana has been started. Nearly all the families so far published have been so arranged.

Visiting botanists who worked on Malaysian plants include Mr. J. Wyatt-Smith (Kepong), working especially on *Durio* and *Calophyllum*, and Mr. J. Sinclair (Singapore) working mainly on *Annonaceae*.

Specimens sent for identification from India and Ceylon were among the enquiries dealt with during the year.

Tropical Africa. The year has seen a start made on the preparation of the " Flora of Tropical East Africa ". The accounts of the *Ranunculaceae*, the *Oleaceae* and the *Marantaceae* were published during the year and work was begun on a number of other families. Meanwhile, the naming of collections from East Africa has continued, but at a lessening pace owing to the increase in the amount of time devoted to research.

The enumeration of plants collected in Nyasaland by L. J. Brass on the Vernay Nyasaland Expedition, 1946, was completed during the year and the typescript forwarded to the New York Botanical Garden, who have kindly undertaken its publication.

Collections of a high standard have continued to be received from our numerous correspondents in Africa. Whilst it is not possible to mention all by name, the following have sent in particularly fine collections :— P. Adames, F. C. Deighton, T. S. Jones, H. D. Jordan, D. Small (Sierra

Leone), J. T. Baldwin, Jnr., A. J. D. Barker (Liberia), J. E. Andoh, K. Obeng Darko (Gold Coast), various collectors through the Forestry Herbarium, Ibadan (Nigeria), H. C. Dawkins, J. W. Purseglove (Uganda) P. R. O. Bally, A. Bogdan, P. J. Greenway, R. W. Rayner, B. Verdcourt (Kenya), W. J. Eggeling, Mrs. H. G. Faulkner (Tanganyika), G. Jackson (Nyasaland), H. Wild and others (Southern Rhodesia), Mrs. H. M. Richards (Northern Rhodesia), O. B. Miller (Bechuanaland). Smaller, but no less useful, collections have been received from other helpers, to all of whom sincere thanks are due. It is regretted that routine work on the naming of collections from countries other than those covered by the " Flora of Tropical East Africa " has not been possible during the year since the work on the Flora must take priority.

Most useful collections of duplicates have been received in continuation of exchange from the Jardin Botanique, Brussels (Belgian Congo), the Centro de Botanica da Junta de Investigacoes Coloniais, Lisbon (Portuguese Guinea and Mozambique), the National Herbarium, Pretoria (mainly South Africa), the East African Herbarium, Nairobi (mainly Kenya and Tanganyika) and the Istituto Botanica della Universita, Firenze (Ethiopia). Owing to the continued help of our colleagues in these and other herbaria, the collections at Kew have thereby been greatly strengthened.

In February, Mr. J. B. Gillett left on a collecting expedition to the frontier of Kenya and Ethiopia. He was attached to the Kenya-Ethiopia Boundary Commission and has already made an extensive collection of the flora of the dry regions along the boundary, an area which has never been thoroughly worked. In November he moved into Ethiopia to collect in the southern region, which is botanically very little known. Later in the year, arrangements were made for Messrs. J. H. Hemsley and R. B. Drummond to visit Tanganyika, Kenya and Uganda on a collecting expedition in 1953. It is hoped that they will visit some of the localities much collected by German botanists and rediscover some of the little known species described at Berlin earlier in the century.

Only one of the two botanists due to be engaged under the Colonial Office Development and Welfare Research Scheme was appointed during the year. We are glad to record that Miss E. A. Bruce, who left Kew in 1946 to take up a temporary appointment in the National Herbarium at Pretoria, was appointed to this post and started research in June in connection with the preparation of the Flora of Tropical East Africa. It is regretted that Miss D. R. Thompson, who was preparing illustrations for the " Flora of Tropical East Africa ", resigned during the year.

Visitors to the herbarium working on African groups were fewer than in recent years. Dr. F. W. Andrews completed his work on the Sudan flora and left Kew early in the year. Mr. B. Verdcourt, whilst on leave, carried out some research in the *Rubiaceae*. Dr. B. Schubert and Dr. R. Wilczek visited the herbarium in connection with their work on the " Flore de Congo Belge et du Ruanda-Urundi ", and Dr. F. A. Mendonça, Dr. A. R. Rocha da Torre, Dr. J. G. Garcia came to work on the " Conspectus Florae Angolensis ", and on their collections from Mozambique. Others who paid short visits included Mlle. N. Dumas-le-Grand, Professor W. Domke, Dr. G. M. Schulze and Prof. K. Suessenguth.

Mr. O. Hedberg of the Uppsala Universitets Institution came to Kew in September to work on the rich collections of the East African high mountain flora, which he made in 1948 and will be continuing this work in 1953.

As in past years our thanks are due to those from whom we have received considerable assistance in the naming of critical plants, among whom should be mentioned Dr. C. E. B. Bremekamp, Prof. K. Suessenguth, Dr. H. Horn af Rantzien and Prof. F. E. Wimmer.

The revision of Hutchinson and Dalziel's " Flora of West Tropical Africa " has been continued throughout the year by Mr. R. W. J. Keay, who has now nearly completed the first, and by far the most out of date, part. Mr. Keay has found that the rich collections from West Africa received in the last 25 years have caused him to take longer than had been anticipated.

Mr. J. P. M. Brenan has continued to act as Secretary of the Association pour l'Etude Taxonomique de la Flore d'Afrique Tropical (A.E.T.F.A.T.) and has made preliminary arrangements for the meeting at Oxford late next summer. The third A.E.T.F.A.T. Bulletin was issued during the year, and the account of the business transacted during the Brussels Conference was printed and distributed to members through the generosity of the Belgians, who were our hosts on that occasion.

South Africa. Some progress has been made in laying out, mounting and incorporating the large accumulations of named duplicates presented by the various herbaria of South Africa, but the number of these is again increased by further acquisitions during the year. The latter included a large number of photographs presented by the Chief, Division of Botany, Pretoria.

Numerous miscellaneous enquiries, particularly from the National Herbarium, Pretoria, and largely concerned with the genera being studied for the continuation of the *Flora of Transvaal*, were dealt with by Mr. B. de Winter, whose secondment has been continued.

Work on a revision of the genus *Eragrostis* (*Gramineae*) has continued and a start has been made on a similar study of *Euclea* (*Ebenaceae*).

The task of matching National Herbarium, Pretoria, specimens with types in the Kew and Natural History Museum Herbaria continues. These matched specimens will, it is hoped provide bases for future revisions to be undertaken in South Africa.

America. A large part of the year was spent in the identification and incorporation of the many bundles of mounted unnamed specimens from all parts of tropical America which had been accumulating over a long period. The work of naming the Sandeman and Stafford Peruvian collections has been continued, and the help of several American specialists is gratefully acknowledged. The *Compositae* are now ready for incorporation. The draft of the account of *Convolvulaceae* for the Flora of Trinidad and Tobago has been sent to Trinidad.

Special work on *Bignoniaceae.* This has been mainly occupied with the large and valuable loans from the New York Botanical Garden and the Colombia National Herbarium, while a useful consignment from the Instituto Agronomica do Norte (Para) was also dealt with.

Australasia. With Dr. Melville's departure to Australia on July 1st the volume of work has naturally been much reduced and only the naming of living plants or the answering of urgent queries has been possible for much of the time.

The routine naming of collections, when time permitted has been continued, especially of the large Morrison collection from Western Australia. The families dealt with include Pittosporaceae, Tremandraceae, Polygalaceae, Stackhousiaceae, Rhamnaceae, Sapindaceae, Goodeniaceae, Boraginaceae and Liliaceae.

Valuable collections of duplicates have been received from the herbaria at Canberra and Sydney, including many Eucalypts.

Miss N. Burbidge who has been seconded to work at Kew on Australian plants began work on 28th November.

Orchidaceae. As in previous years many living plants from the Gardens were determined as well as collections from many parts of the world. In particular following the publication of Dr. L. O. Williams' " Orchidaceae of Mexico ", it has been possible to name accurately the fine collection made by G. B. Hinton in that country. Work was also continued on numerous collections from Africa, including those on loan from the Brussels Botanic Gardens and from M. G. Le Testu.

The determinations of the orchids for the " Flore du Parc National Albert " was completed and a paper on the new species, etc., is now in the press. Research was continued in connection with both the Flora of West Tropical Africa and Flora of Tropical East Africa.

Gramineae. The preparation of the account of this family for the Flora of Tropical East Africa began last January and the text for 32 small genera has been completed. Descriptions of several genera have been prepared also for the Flora of Tropical Africa, and of new species for publication in the Kew Bulletin. Less time has been available for the examination of very numerous specimens sent in for identification, nevertheless a number of these have been named. Valuable collections have been received from most parts of tropical and South Africa, India, Malaya, Australia, New Zealand, and North and South America. Instruction in the structure and identification of grasses has been given to botanists proceeding to or from the Anglo-Egyptian Sudan, Kenya, Tanganyika Territory, and West Africa, as well as assistance to overseas botanists studying the Kew collections. As in previous years reports have been supplied on various problems connected with the family, such as the nomenclature of grasses, the classification and distribution of bamboo, sources of seed, on grasses likely to be of economic value in parts of the British Commonwealth, etc.

Cyperaceae. As at least two-thirds of official time in 1952 was spent on the preparation of the Flora of Tropical East Africa, less routine naming and general curatorial work was done.

The genera of the tribe *Cladieae* were those first prepared for the Flora, as these are either small genera or poorly represented in East Africa : they are *Carpha*, *Tetraria*, *Cladium* and *Remeria*. There followed eight species of *Rhynchospora*, the only genus of the tribe *Rhynchosporeae* occurring

in East Africa. To elucidate the species of *Hypolytrum* for the Flora, it was found necessary to investigate the whole group in tropical Africa. This gives some indication of the great need for research into many African *Cyperaceae*. Finally, the study was begun of the remarkable genus *Coleochloa* (*Eriospora*), which has been much misunderstood. It and the equally interesting West African genus *Microdracoides*, with *Trilepis pilosa*, are the only African representatives of the otherwise American tribe *Lagenocarpeae* (*Crytengiae*).

Vascular Cryptogams. In addition to normal routine determinations and reports much of the year was taken up with work connected with the Flora of Tropical East Africa. No large collections were received during the year, most of the incoming material arriving as a steady trickle from the African section. Visitors working in the department during 1952 included Dr. E. A. C. L. E. Schelpe (African species of *Blechnum*), Mr. W. J. Harley (Liberian Ferns), Dr. K. N. G. MacLeay (Sudan Ferns) and Dr. W. A. Sledge (Ceylon Ferns).

Bryophyta. Collections have been named and incorporated. A valuable addition was the set of hepatics of the Cambridge University Botanical Expedition to Nigeria, 1947–8. Sets of duplicates from Kew have been sent to Ibadan, Brussels, and other herbaria. The genus *Sphagnum* is being sorted, arranged, and specimens of this genus determined. Expert assistance has been gratefully received from Dr. A. Le Roy Andrews and Mr. A. Thompson. The preparation of a reference slide collection has been started and the indexing of literature and new species.

Fungi. The mycologist's attention has again been devoted primarily to completion of his studies in the West Indian Agaricales. A paper treating of the Trinidad Rhodosporae and Ochrosporae has been accepted for publication in the Bulletin of the French mycological society as it proved impossible to obtain funds for publication of the necessary plates in a British journal. During September the senior mycologist was enabled to attend officially the joint meeting of the British and French Mycological Societies at Mamers, and thus to renew personal contacts with French specialists which have proved so valuable in this and other ways. Considerable progress has also been made in a study of West Indian Gasteromycetes.

Extensive collections of Aphyllophorales have been received from Australia, Pakistan and West Africa, especially from Sierra Leone, and have been determined by the assistant mycologist. A valuable reference collection of Australasian polypores was presented by Dr. G. H. Cunningham of New Zealand. A small collection of Agarics from Arnhem Land was also received for determination.

The revision of British Helotiaceae mentioned in last year's report is now complete.

Because of the abnormally cold autumn the number of Agaric collections received was much smaller than usual but a few species hitherto unrecorded in Britain came to our notice, notably 3 species of *Coprinus*. The rare puffball *Bovistella radicata* (Mont.) Pat. was received from

Richmond Park and a new British grass smut, *Entyloma holci* Liro from Zetland.

An English edition of Gram and Weber's Plantesygdomme, edited and brought up to date by the senior mycologist, was published in April, 1952.

Several foreign specialists have worked in the department during the year, notably Miss J. Dingley of New Zealand, on Hypocreales ; Dr. M. Moser of Innsbruck on Cortinarius ; Dr. H. J. Brodie of Indiana, on Nidulariaceae and Dr. A. P. L. Digiglio of Tucuman, Argentina, on South American Agaricoles. Prof. N. J. G. Smith has continued his studies in South African Gasteromycetes. Dr. A. H. Magnusson visited the lichen herbarium in connection with his studies in *Lecidea*. Extensive loans have also been made to Swedish specialists monographing tropical foliicolous lichens and European *Collema* species respectively. It has been of great value to have this large body of material critically revised at one time.

Algae. Determination were made of marine algae for a number of institutions and individuals in the British Isles—some in connection with a projected new handbook on Seaweed ; of aerial and freshwater algae mainly in connection with the improvement of lawns and the care of garden ponds ; and of Australian and Gold Coast marine algae involving a good deal of correspondence because of the lack of authentic specimens in the Kew Herbarium.

Enquiries included requests for information on the location of types and comparison with Kew specimens ; the possibilities of using seaweeds in various fields of commerce ; and the collecting of seaweeds for various purposes including medical research.

Additions to Kew Herbarium include 165 S. Australian Algae presented by Univ. of Adelaide ; 250 American Algae from Allen Hancock Foundation and 104 American Algae presented by Univ. of California (Berkeley).

Visitors studying Algae at Kew in 1952 were H. B.Womersley (Adelaide Univ.), Prof. Rayss (Jerusalem), and A. Mahmoud (Manchester U.).

Spirit Collection. Another 1,000 gatherings were added to the collection during the year. Again material of African origin predominated, including especially Orchidaceae, Marantaceae and Commelinaceae. Nearly all important African collections received now contain a high proportion of spirit materials in suitable families.

Fumigation Apparatus. The Hydrogen cyanide chamber was used in routine fumigations of incoming material on fifteen occasions during the year. The smaller Methyl bromide chamber, owing to an unexpected breakdown, was used on only six occasions.

No outbreaks of insect attack in the Herbarium were reported during the period under review.

Index Kewensis. Good progress has been made in the compilation of the 1951–1955 Supplement, but this work has been much hampered by proof-reading of Supplement XI, covering the years 1941–1950, which should be

completed during the first quarter of 1953. Although this latter supplement covers ten instead of the normal 5 years it will not be much more than 25 per cent. larger than previous supplements. This is accounted for by the disruption caused by the War and by the destruction of the greater part of the Berlin-Dahlem herbarium.

Some revision of the list of periodicals which are regularly inspected by the compilers has been undertaken and a number which were formerly included have been deleted. Some semipopular journals dealing with such groups as the *Cactaceae* are not available to the compilers and new names published in such journals will be omitted unless they are picked up from such sources as the Gray Herbarium card index or from separates supplied by authors.

Lists of the " new " genera included in supplements 2–6 have been prepared during the year and it is hoped that these will be published in the near future.

The preparation of a new loose leaf Index, including the original work and all supplements, to occupy about 80 volumes, has been commenced; this will save a great deal of the time used in searching through the various supplements.

Botanical Magazine. Parts 1 and 2 of volume 169 (N. S. tt. 176–197) edited at Kew by Dr. W. B. Turrill for the Royal Horticultural Society were published in 1952. Of the 22 articles, 17 were contributed by members of the Kew staff. Much original and often extended research was involved in the preparation of many of these articles. The Royal Horticultural Society has presented the originals of the coloured plates and of the black and white text figures to the Kew Herbarium.

The Library

The addition of an Assistant Librarian to the library staff in April has relieved the pressure of work to a certain extent. As a result more time is now devoted to cataloguing and classifying and to re-arranging certain sections of the library.

Another shelf has been added to each of the presses in the first floor front library and the Catalogue Room, thus providing much needed shelf room for further expansion.

As usual, a number of books were sent to be bound, re-bound or repaired. Some of these were " arrears " and it is gratifying to report satisfactory progress in reducing the number under this heading.

Further attention was given to the reprints and many of these were re-filed in new boxes. A classified index to systematic papers of special interest, appearing in periodicals, was commenced during the year 1952.

Work was begun in June on the new pasted-down copy of the Index Kewensis and it is pleasant to record that this work is proceeding steadily.

Publications have been lent to other Government Departments and Agricultural Bureaux while we, on our part, have borrowed a certain number from other libraries for the use of the Kew staff. Books from the Frederick Adams collection have been lent on behalf of the Bentham-Moxon Trustees to workers on Diatomaceae.

We are again indebted to various authors, to members of the staff and others for presentations of books. A certain number have also been sent to us by the publishers for review in the Kew Bulletin. Many periodicals have been received in exchange for the Kew Bulletin and Hooker's Icones Plantarum, while other publications have been received in exchange for duplicate material.

Valuable contributions to the library have again been made by many societies, academies and other institutions, including the New York Botanical Garden, The Royal Horticultural Society, the California Academy of Sciences, the Carnegie Institution of Washington, Smithsonian Institution, the Royal Swedish Academy of Sciences, Stockholm, the Geobotanisches Forschungsinstitut Rubel, Zurich, the Danish Botanical Society, Jardin Botanique de l'Etat, Brussels, Division of Botany, Union of South Africa, United States Department of Agriculture, the Commonwealth Mycological Institute, the Empire Cotton Growing Corporation, the Commonwealth Agricultural Bureaux, the Forestry Commission, Natural History Societies and many Departments of Botany, Agriculture, and Forestry all over the world. Members of the staff and other authors, too numerous to mention individually have kindly presented reprints of their botanical papers.

The Ministry's Photographic Department has continued to make photostat copies of rare and important publications and valuable additions have been made in this way to the Library.

As in past years generous presentations by various donors have been made to the collection of drawings and to the map collection.

The Museums

The routine work of the Department and the identification of economic plant products has followed much the same pattern as in recent years. Between eleven and twelve hundred enquiries were dealt with during the year.

In the earlier part of the year assistance was given with an exhibition in London concerned with the Elizabethan period. It was desired to show, among the objects displayed, plants or plant products that had recently been discovered or were of interest at about that time. Specimens were supplied on loan and information concerning the early history of the plants concerned was supplied. These included Cinchona or quinine, logwood, cloves, the sunflower, " lignum nephriticum " (*Eysenhardtia amorphoides* H. B. & K.), tobacco, the potato, pineapple and cashew nut.

Advice has also been given in connection with leaves that might be suitable as cigarette leaf-wrappers in an area in the East where the customary supplies of leaves of *Butea frondosa* Roxb. from an adjoining country had become difficult to obtain. Among leaves suggested for trial in the manufacture of local " biris " or leaf cigarettes were those of *Cordia dichotoma* Forst., *Shorea robusta* Gaertn. and *Bauhinia racemosa* Lam. The possiblity of using maize cob shucks or sheaths and of softening or rendering more pliable readily available leaves of suitable size by a simple chemical treatment was also suggested.

Among the numerous seeds received for identification during the year were some which had been found by archaeologists at Puddlehill

associated with pottery considered to date from the 1st century B.C. They were believed to be seeds of *Lithospermum arvense* L. This may be significant in view of the special interest now attached to certain species of *Lithospermum* on account of their use among primitive people for inducing temporary sterility (now well authenticated, especially on the North American Continent).

Other miscellaneous enquiries have included the following :—the economics and distribution of *Catha edulis* Forsk. the leaves and young twigs of which constitute the drug " khat ", once considered a fairly harmless beverage but now realised to be a dangerous drug : the chemical control of water weeds : the Japanese technique for dwarfing trees : the ages of Yew and other long lived trees : the cultivation of the Chinese gooseberry (*Actinidia chinensis* Planch.) in England : the identification and methods of cultivation of " tiger nuts " (tubers of *Cyperus esculentus* L. and related species) recently on sale for edible purposes in this country : cultivation and production of the oyster nut (*Telfairia pedata* Hk.) now sometimes imported : the uses of prickly comfrey (*Symphytum asperrimum* Donn.) as a fodder plant : information on star anise, juniper berries and the economic value of plant galls. Several specimens of hemp (*Cannabis sativa* L.) which were said to have suddenly appeared in gardens were received for identification. They may have owed their origin in some instances to the refuse discarded by bird fanciers, hempseed being commonly included in seed mixtures for cage birds.

Although not botanical, except perhaps in name, one subject that has recurred throughout the year reflects a current " craze ". This is the so-called " sea fern ", " sea moss " or " air fern " that has been on sale to the public. It consists of the horny perisarc of colonies of the small marine coelenterate *Sertularia cupressina*. As sold for decorative purposes the material is usually dyed green to resemble a plant (or dyed other bright colours) and receives a preliminary glycerine treatment to prevent brittleness. The claim is often put forward by vendors that the " fern " lives and grows without soil or water !

The task of tracing the possible identity of plants when the only clue is an obscure common name is often difficult or impossible. " Ivasuchen " a word from a German novel was among those submitted. The word directed attention to " Iva " a name for *Achillea moschata* Wulfen, from which an unusual liqueur " Ivalikor " or " Ivawein " is made. A small collection of seeds of Chinese vegetables, all with Chinese names, was received during the year also a collection of food grains from India under Indian vernacular names. Most of these specimens were identified.

The usual miscellaneous enquiries relating to poisonous plants were received. In October one member of the staff (Mr. S. G. Harrison) assisted in an investigation of the possible cause of death of cattle in a field in Staffordshire by visiting the area. No fewer than fourteen poisonous species or species suspected of being poisonous to livestock were found in or around a field of sown pasture where the poisoning took place.

Among the donations received during the year was a good set of some of the " newer " West African timbers (plank size) now imported into this country. These were not formerly represented in the Museum collection. The trade in these timbers is mainly recent or dates from the

Second World War. The specimens received, all from Nigeria, were—Agba (*Gossweilerodendron balsamiferum* Harms.), Ayan (*Distemonanthus benthamianus* Baill.), Gedu Nohor (*Entandophragma angolense* C. DC.), Guarea (*Guarea cedrata* Pelleg.), Okan (*Cylicodiscus gabunensis* Harms.), Opepe (*Sarcocephalus dideirichii* Wildem.), Sapale (*Entandophragma cylindricum* Sprague). Another useful donation was a range of vegetable tanning materials and extracts to augment the existing collection of vegetable tans on display in the Museum. This consisted of a very fine polished section of a quebracho trunk, various quebracho extracts, bark and extracts of black wattle or mimosa, chestnut extracts, myrabolans and extracts, and specimens or extracts of sumac, valonea, gambier, divi-divi, algarobilla and tara.

In the two timber museums several of the specimens of sleeper size, which had become dull or faded, were planed and resurfaced. It is very noticeable with timber specimens in the museums that dark coloured specimens tend to fade or become light coloured whereas white or light coloured timbers such as lime and many Conifers darken in colour after having been on display for some years. The work of cutting down the larger specimens in the timber reference collection has been continued and considerable progress has now been made. This has resulted in better arrangement of existing specimens and of some much needed extra space becoming available.

The Keeper has continued to serve on various committees concerned with economic plants or plant products. In September Mr. Harrison acted as Honorary Secretary of Section 7 (Tropical and Sub-tropical Horticulture) of the Thirteenth International Horticultural Congress held in London. In addition to providing useful experience the Congress afforded good opportunities for meeting economic botanists from other countries.

Jodrell Laboratory

Work on the systematic anatomy of the monocotyledons has been continued steadily throughout the year. A considerable number of microscope slides of grasses have been examined by the Keeper and the anatomical data recorded in the card index. The information that has been collected in this way is proving of great interest in connection with the taxonomy of the Gramineae. Dr. Stant working in collaboration with the Rural Industries Bureau has devoted considerable time to studying the structure of reeds (*Phragmites communis*) and has found considerable variation in the structure of samples from different localities. The thatching qualities of the reeds appear to be correlated with these anatomical variations so that extension of our basic knowledge has also its practical value. An account will shortly be ready for publication. Dr. Stant's work on the monocotyledons has also included a brief investigation of the structure of canes used in the manufacture of fishing rods. Dr. A. Fahn, a visitor from the Hebrew University of Jerusalem, is also engaged in work on the comparative anatomy of the monocotyledons, and has devoted special attention to the *Xanthorrhoeaceae*. He has examined material cultivated in the Gardens, herbarium and museum specimens, and preserved material collected in Tasmania, by Dr. W. M. Curtis of the University of Hobart.

Anatomical studies of certain dicotyledonous plants have also been made in collaboration with studies in the Herbarium, usually to ascertain the most probable affinities of the genera concerned. In this connection, Dr. Stant found evidence that corroborated the view that *Nyctanthes* and *Dimetra* are more closely allied to the *Verbenaceae* than the *Oleaceae*. The Keeper also examined the anatomy of *Heptacodium* and of *Anisophyllea guianensis* Sandwith, the last species being the first member of its genus to be discovered in the New World. Another anatomical investigation confirmed that *Sesamothamnus* is more closely allied to the Pedaliaceae than to the Bignoniaceae.

Mr. F. Richardson and Miss D. Catling have prepared microscope slides of some 200 grasses, and additional slides of members of the Xanthorrhoeaceae. All of these slides have been added to the reference collection. Slides of the secondary xylem of about 50 species of plants from the Temperate House have also been added to the reference collection. These are mostly of species that are infrequently cultivated in Great Britain and of which it is very seldom possible to obtain mature woody material without damaging the plants.

About 130 miscellaneous enquiries have been answered during the year, most of which entailed examining various types of material microscopically with a view to establishing its identity. Altogether about 250 specimens and samples have been examined in this connection. A large proportion consisted of timbers, archaeological specimens, and the roots of trees undermining the foundations of buildings. Some of the more unusual material included the following. Specimens were reported on for the Dept. of Customs and Excise. A number of stems and roots of tropical origin were identified on behalf of the Director of the Metropolitan Police Laboratory. Living plants of a species of *Aponogeton*, imported by air from Ceylon for cultivation in fish tanks, were found to be infested with a fungus belonging to the Chytridiaceae, which impaired the growth of the plants. It was eventually discovered, with the cooperation of mycological colleagues, that the fungus is a previously undescribed species. Powdered leaves, being offered commercially as a substitute for sage, proved to be those of a species of *Cistus*. Pollen in honey of Australian origin was found to be derived from eucalyptus, and not from Banksia as was suspected by the importers. The host plants of a number of fungi were identified for mycological colleagues both in the herbarium and at the Commonwealth Mycological Institute.

A much needed store for dangerous and inflammable chemicals has been provided by H.M. Ministry of Works, who ingeniously adapted a disused coal cellar at the back of the laboratory for this purpose.

Donations to the laboratory included a lithographed portrait of Miss Sargent and a valuable collection of microscope slides of seedlings presented by Dr. Agnes Arber, F.R.S. The slides were prepared by the late Miss E. Sargent who received her early training in research methods at the Jodrell Laboratory where she worked under the supervision of the late Dr. D. H. Scott.

Dr. W. M. Curtis has sent consignments of preserved monocotyledons from Tasmania for our research programme. Professor R. E. Holttum sent preserved material of various members of the *Zingiberaceae* from

Singapore, and a useful collection of *Cyperaceae* and other monocotyledons has been received from Mr. R. H. Anderson, Curator of the Herbarium at Sydney, New South Wales.

Besides numerous visitors who have called at the laboratory for consultations and to discuss botanical problems, the following have made more extended visits to the laboratory for research purposes :—

Dr. A. Fahn. Anatomy of monocotyledons, particularly *Xanthorrhoeaceae*.
Mr. R. C. Carolin. Cytology of *Dianthus*.
Senora E. Paunero. Anatomy of *Gramineae*.
Professor R. D. Gibbs. Comparative biochemistry of *Acer* and other plants.
Dr. Scott. Wood structure in relation to palaeobotany.

The Keeper continued to serve on a pharmacognosy subcommittee, set up by the British Pharmaceutical Society, to assist in revising the British Pharmaceutical Codex. Meetings of the subcommittee were held regularly throughout the year.

The Gardens

The rainfall for the year 1952 totalled 28·19 ins. a figure which is a great advance on the totals made the previous years. It is a considerable help to have such a comparatively heavy rainfall, having regard to the very light nature of the soil at Kew, and of the rapidity with which the soil moisture drains away. Oddly enough the two driest months of the year were February with just under 1 in. of rain and July when ·6 in. fell. February dryness expedited the work but the drought in July occasioned considerable anxiety in order to ensure that plants did not suffer from sun scorch. The number of visitors from home and overseas desirous of making personal contact with the Gardens increases, and personal enquiries for plant identification and general advice became even more numerous. The total dealt with by the Curator and his staff reached the record of 6,024.

Arboretum

On January 1st, 1952 the Director and Curator made a general inspection of the woodland areas adjacent to the stable yard and the rhododendron dell. Some twenty four large beech trees showing disease were scheduled as dangerous and marked for removal.

Fairly heavy losses have also occurred in various parts of the grounds, these including Sweet Chestnuts, Ash, Elm, Oak, Hornbeam, and a number of Conifers totalling twenty five trees in all. Adjacent to the north side of Kew Palace three large Lombardy Poplars and a Plane tree died during the summer of 1952, because of a leak in a nearby gas main. At the lake side one of the two remaining trees of large White Willow had to be taken down.

The removal of so many old specimens during the past eight years has resulted in numerous open spaces being created in the wooded areas, and these are being utilised for planting trees more particularly those of botanical interest. Grass grows with remarkable speed in these clearings,

and consequently an additional motor scythe has had to be purchased to cope with this work.

The work of making good the area near Isleworth Gate where serious erosion had been caused by the river breaking through the river bank has now been completed. The boundary fence has been erected on a new line and a collection of young willows planted, to replace those lost by the landslide and the repair work that subsequently had to be carried out. Planting in this area has become very difficult because when the top soil was removed most of the filling was broken concrete and hard-core so that no great depth of soil is available at any one point. It is therefore doubtful if the Willows will thrive.

On the whole the season has been a favourable one although the July drought was distressing. It did not seriously affect established trees and shrubs although it brought about a certain amount of premature leaf fall amongst both Poplars and Limes. Watering had to be carried out incessantly, and all available equipment was in constant use to keep plants from harm.

The spring flowering display was probably the best for some years and particularly outstanding were the Japanese Cherries. The Magnolias, Prunus, Malus, Syringas and Philadelphus flowered exceptionally freely, whilst other outstanding subjects included the Halesias, Hibiscus syriacus varieties, Rhododendron occidentale hybrids and the various rambling and climbing forms of roses in the dell near the Pagoda. The Hamamelis flowered well as did the plantings of Daphne mezereum at the back of the Clematis wall and on the chalk garden. The autumn colour was the most prolonged for many years, and amongst items of special interest the Beech and Oak were outstanding.

Rhododendron bug and bud blast have become prevalent in the large flowered hybrid Rhododendrons in both the dell and also along the Broad Walk. Control measures are difficult and as the bud blast is seriously affecting the display of flower each year the problem becomes one of special importance. Unfortunately, a number of species have also been attacked including Rhododendron ponticum which had always been regarded previously as immune. Additional spraying equipment of modern design will have to be obtained to combat the pest and disease.

The numbers and quantities of seed collected have again been well up to the standard of previous years there being quite good crops of most of the usual subjects. Several that do not seed regularly have this year done well. A few new subjects flowered this year for the first time, the most outstanding of these being the hybrid Magnolia kewensis, a natural hybrid between M. salicifolia and M. Kobus. Flowers of this plant were exhibited at the Royal Horticultural Society's Show on April 8th and received an Award of Merit.

Among the additions to the collections during the year have been the presentation of seeds of Fothergilla gardenii, Magnolia macrophylla, Paulownia Fortunei, Daphne Giraldii, Picea Breweriana, Rehderodendron macrocarpum, Sorbus megalocarpa, Quercus Brewerii, Quercus Kelloggii and Quercus Sadleriana. Plants presented included Lindera biloba from Messrs. Hillier, and two interesting Prunus hybrids, Prunus × Kursat and Prunus × Okame from Captain Collingwood Ingram.

Several new types of label are being tried at present in order to find a successor to the lead label which has been in use for some years but which is to-day expensive to buy and also in short supply. These two factors have no doubt been responsible for the increasing theft of lead labels from trees and shrubs in isolated parts of the grounds. Not only is extra work caused by this but specimens are often damaged by the hurried removal of the labels.

During the spring the areas given over to the war-time and post-war production of food were finally sown down, and as the resultant grass developed strongly the lawns in front of Kew Palace have taken on much of their previous appearance.

Economy measures have necessitated only minor path repairs being carried out during the year, but the wisdom of such economy is to be questioned when one examines the damage caused by frost during recent weeks to badly worn paths into which moisture has seeped.

In the stable yard a new underground storage tank has been installed to hold some two hundred and fifty gallons of tractor vapourising oil. The use of this fuel should reduce the working costs of the David Brown Tractor, which up to date has been run on petrol.

The labour problem continues to cause added anxiety and there have been a further nineteen changes in the Arboretum staff during the year.

Decorative Department

As is customary the display of Darwin and May flowering tulips formed the main feature of the spring bedding. As in 1951 all the beds were again treated with a proprietary soil steriliser prior to bulb planting in October, with the result that no signs of tulip fire were to be seen throughout the whole of the bedding schemes.

Great difficulty was experienced during the months of June and July to get the summer bedding plants established because of the prolonged drought, and it was not until August that the beds began to look their best. When the weather conditions changed during this month, the grey foliaged plants grew away so rapidly that they had to be constantly cut to prevent them overgrowing the Begonia semperflorens used in this scheme.

The rose garden once again proved very popular and the first and second display of bloom gave pleasure to thousands of visitors. During the winter new beds were planted of varieties Sultane, Forty Niner, Eden Rose, Monique, and Tally Ho, and these new varieties aroused much interest and added to the variation of colour in the display. In the Conservatory seasonal decorative plants were attractive, more particularly Primula malacoides vars., Cinerarias, Calceolarias, Schizanthus, Streptocarpus, Pelargoniums and Stocks. In late autumn Chrysanthemums proved very affective and especially the Cascade and Pyramid types. The decorative varieties produced one of the best late displays of flower for many years due more particularly to the addition of the new house in the Melon Yard No. 21b where plants can be retarded without damping off. In the early part of December the worst fog for many years was experienced and this brought to an end the flowering of the Gloire de Lorraine and other Begonias whilst damage caused to other plants will

be evident for many months to come. Strangely enough the one flowering subject which survived the fogs without any apparent damage was a large plant of Acacia Baileyana growing in one of the centre beds of the house.

During the year various repairs were carried out to glasshouses and Houses 19, 22, 23a, were stripped, all metal framing cleaned of rust and painted, and woodwork renewed where necessary. After internal and external painting the houses were brought into use towards the end of the year. In early spring new lattice blinds were fixed on Houses Nos. 23 and 4 forming a much more permanent solution to the shading problem.

In the Decorative potting shed a new pot-washing machine was installed, this proving one of the most useful introductions made in the Gardens for some considerable time. The old skeleton frame in the Melon Yard was replaced by a new greenhouse and linked on to House No. 21 which was also re-built.

The demonstration fruit and vegetable plots laid down early in the war and continued afterwards were removed thus breaking the last link with the war time ' Dig for Victory ' campaign.

Temperate Department

The newly completed Australian House was taken over from the builders on February 20th, 1952 and planting of the large centre bed began a few days later. The largest plant to be moved was a specimen of Doryanthes excelsa, the New South Wales Spear Lily, of flowering size and weighing about thirty hundredweight. During the year the plant became well established in its new quarters.

Other large plants placed in the bed include Stenocarpus sinuatus, the Queensland Wheel of Fire, Lagunaria patersoni, Grevillea hilliana, Hymenosporum flavum, Casuarina glauca, Eucalyptus citriodora and Acacia baileyana, while many characteristic Australian genera are represented by smaller plants, e.g. Correa, Epacris, Banksia, Grevillea, Prostanthera, Boronia, etc. On the north side of the bed an area of peaty soil has been prepared and here is represented the only Rhododendron native of Australia, Rhododendron lochae from the Queensland mountains. Planting was completed and the house opened to the public on the 15th March, 1952.

Following the removal of Australian pot plants to the new house it has been possible to place the collection of South African plants in pots in a much lighter position. A new type of regional label has been introduced and space has been found for groups from the Atlantic Islands and Polynesia.

Two beds at the north end of the Himalyan House were excavated to a depth of four feet, and after the land drains had been cleared, re-soiled with more porous material. This operation involved the removal by wheelbarrow of some one hundred and fifty tons of material, and its replacement by an equal quantity, showing once more the need of securing access to the house for motor or horse drawn transport.

At the south end of the Mexican house two large specimens of Metrosideros tomentosa were removed, together with a number of smaller plants. This greatly reduced the overshading at this end of the house and should benefit considerably more light-demanding plants now growing here.

Similar operations on a smaller scale have been carried out elsewhere in the Department.

After several pieces of ornamental ironwork had fallen a structural survey of the building was completed, and the remainder were removed, together with most of the stone urns which surmounted the pillars of the outer walls. Two chimneys have been re-built during the year.

A large number of plants received by the Department of recent years have been found to be incorrectly named, and prior to indexing and labelling, a systematic check of the collections has proved to be essential. During the year, 196 determinations and 339 verifications of names were made in the Department, and 51 and 21 respectively at the Herbarium. The help most readily given by the Botanists has been most valuable and is greatly appreciated. In addition to the above, 129 specimens have been referred to the Department for determination and 7 for verification.

Aristea platycaulis a plant unknown in the wild state and apparently represented in Herbaria only by the type at Kew was discovered in the course of checking, and additional herbarium material was obtained This species, for which a separate section of the genus has been proposed, is being propagated for further investigation and distribution.

An old plant of Banksia verticillata near the Temperate House Office, after being very chlorotic for some years, showed great improvement three weeks after the injection into its trunk of about 1 litre of 0·25 per cent. ferrous sulphate solution with 0·025 per cent. sulphuric acid. In a preliminary test, response to iron was obtained following absorption of the same solution through petioles, but no response followed its application to the leaf surface.

Arundinaria falcata, most of which died last year following flowering, flowered again on the remaining culms this year. No seed set and our stock has now been lost. An attempt to prevent flowering on some plants by cutting them to ground level as once suggested by Mr. Bean proved unsuccessful.

Among the more interesting plants which flowered this year, mention may be made of Aristolochia gigantea, Eucalyptus ficifolia, Banksia serrata, Stenocarpus sinuatus and Clianthus speciosus (syn. C. dampieri). The Stenocarpus is not known to have flowered here before and its flowering may be a response to the better light in the new house. The Clianthus was sown and flowered in the same bed, and despite considerable seedling mortality made a striking feature, one plant producing 45 inflorescences. Though demanding great care to avoid damping off when the plants are small, this method of culture may in the long run prove advantageous over the usual practice of growing grafted plants. In spite of hand pollination, no seed set. Out of doors, on the border surrounding the Temperate House, Fremontia californica, Myrtus communis var. tarentina, and a Citrange flowered freely. The latter, a hybrid fruit (Citrus aurantium × C. trifoliata) raised in U.S.A., set a fair crop which persists, despite fog and frost, at the end of the year.

Among seeds and plants received during the year were several collections from the Monte Bello Islands. The collection of seeds in the Department for distribution to other gardens has again increased. Flowering material of Cestrum elegans var. smithii has been supplied

for the Botanical Magazine, and other material, chiefly of monocots., has been supplied for anatomical work. A large flowering plant of Anigozanthus flavida was exhibited for its botanical interest at Chelsea Show.

A conviction was obtained against a visitor for the theft of Camellia cuttings in May.

Thick and unusually sulphureous fog from 5th to 9th December, left a heavy deposit on the glass, and thorough cleaning of the roofs, especially of the Australian House, is considered urgent. The fog caused heavy leaf-fall in many plants, notably Begonia, Cestrum, Datura, Fuchsia, Jacaranda and Sparmannia, damage to or loss of flower buds in others, e.g. Luculia pinceana, L. gratissima and Templetonia retusa, while a few others were killed, e.g. Drimys colorata, Echium wildpretii and Lotus bertholetii.

Alpine and Herbaceous Department

The reconstruction programme in the rock garden was again continued during the winter months and a further portion of the existing limestone rock was taken down, and the site re-built with Sussex sandstone. Economy necessitated the minimum stone being purchased and consequently only a limited area could be rebuilt.

During summer and autumn, several hundred permanent labels of green china with black lettering superimposed on them were introduced into the rock garden. This type of label is neat, attractive and very economical in that it saves labour in rewriting the wood labels which, at Kew, barely last a year. At the south end of the rock garden one of the large Holly trees was removed, and after making good the impoverished soil a few large Rhododendrons and other evergreen shrubs were planted to provide suitable conditions for the growing of Lilies and woodland plants which have to be maintained by the department.

The alpine house again provided much attention and interest during the spring months of the year with pans of Crocus, Tulipa, Hyacinthus. Muscari and other miscellaneous bulbs, followed by many other types of alpines which are so well adapted for growing in the Alpine House. Special mention should be made of Verbascum davisianum on account of its beautiful woolly, silvery foliage. Colchicum luteum, a very attractive and uncommon yellow flowered species from the Himalayas. Iris histrioides var. major, Fritillaria pallidiflora, a very handsome plant from Siberia, and Tulipa urumiensis having a very neat and attractive golden yellow flowers, a Persian species, also Cyclamen atkinsii and C. coum, the latter receiving an award of cultural commendation at the R.H.S. show.

The Iris garden again provided a colourful display of flower during the month of June. It was thought necessary this year to dig up and replant three of the large Iris beds. Large quantities of mortar rubble and spent mushroom manure were dug into the beds and most of the varieties were replanted. Where stocks permitted however a few new varieties were used and old ones discarded.

The natural order beds provided a pleasurable display of interesting plants during the summer and autumn, and the growth has been con-

siderably assisted by the use of the two new large rotating water sprinklers which were invaluable during the long dry period.

Among many plants of interest which have flowered particularly well this season mention should be made of Paeonia suffruticosa, Astragalus alopecuroides, Allium coeruleum, Onopordon insignis, Lythrum virgatum.

The seed harvest this year was comparatively good, particularly so those which ripened early in the year, but in many instances those which normally mature in late summer and autumn failed to set seed due no doubt to the wet and rather cold period that occurred in August, September and October. Sparrows once again proved a source of trouble playing havoc with certain types of seed and in some cases stripping the plants long before the seed was fit to collect.

The thick fog which persisted for several days during the month of December affected plants out of doors considerably. Many of the lower growing evergreens such as Viburnum davidii and Ceanothus prostratus had their leaves scorched in a remarkable manner.. Silver and woolly foliage plants also seem to have suffered considerable damage.

During the season several large and interesting collections of seeds and plants have again been received, including the following : A collection of unusual N. American alpines including Gentiana Andrewsii, G. crinita and G. puberula, Rydbergia grandiflora and Anemone lithophila sent by Mr. H. Epstein of New York and President of the American Alpine Society. Dr. C. R. Worth sent seeds of a red-flowered form of Lilium canadense collected from an isolated plant growing in the wild. A collection of seeds sent by Mrs. Vernon Dickens from Morocco, while living material of Primula scotica collected on the Island of Hoy in the Orkneys was sent in by A. Doveston.

The purchase of a miscellaneous collection of rare plants and bulbs from Mr. H. Ripley, Horam, Sussex, who had collected many of them from the Mediterranean Regions, Asia and California.

Seeds, cuttings and plants were received also from Cambridge, Edinburgh Botanic Gardens, and the R.H.S. Gardens, Wisley.

A large collection of Celmesia spp. were received from Dunedin Botanic Garden, many of these have already germinated well.

Plants of Nuphar pumila collected at Colemere, Salop, and N. intermedia from Charters Lough, Northumberland were received from Mrs. Heslop Harrison.

Several new hardy American varieties of Water Lilies were also received in fine condition from G. H. Pring of Missouri Botanic Garden, St. Louis.

The Boyko Herbarium, Jerusalem, sent in a collection of unusual grass seeds which are native to Palestine and Syria.

Very little new constructional work was carried out in the propagating department, a row of unheated span frames 32 feet in total length similar in design to other existing frames have been built on the site of some old propagating frames which were beyond repair. They are larger in size and should provide the extra space which is badly needed in the propagating section.

The Alpine house was repainted both inside and out during the autumn.

Plant material used from this department for plates in the Botanical Magazine were Endymion hispanicus, Chrysanthemum gayanum raised from seed sent in by E. K. Balls from Morocco and Eranthis tubergenii a supposed hybrid raised from Eranthis hyemalis and E. cilicica.

Tropical Department

Palm House

The banana bed was resoiled in early spring, and replanted with new plants, propagated from the original stock. Several of the very large specimen Palms and Pandanus, that had overgrown their receptacles were moved on into larger tubs. During this operation the new soil shredding machine was used for the first time, and proved to be a very useful implement for soil mixing, etc., saving a considerable amount of time and labour.

Several of the large specimen cycads produced cones again this year ; Dioon edule produced an exceptionally fine cone, the first time for several years. The large Coffea arabica plants flowered and fruited freely, also several of the matured Palm specimens planted in the centre beds flowered profusely.

It is becoming more and more difficult each winter to maintain a minimum temperature of 65° necessary to keep the plants in good health, owing to the movement of the glazing bars, due to rust corrosion. This lifts the glass and allows the heat to escape. In the middle of October the Palm House was closed to the public, owing to suspected defects in the main structure.

The renovation of the floor of the tunnel, from the Shaft Yard, has proved very successful, and saved labour in conveying the fuel to the boilers.

T. Range and Orchids

The soil in the two permanent beds in the Nepenthes House was renewed and a number of new plants incorporated.

Thunbergia gregorii, received two years ago from Tropical Africa, has proved to be a very useful decorative plant, with large deep golden yellow flowers. This season it flowered profusely for over three months during the summer in House No. 7.

Two new fourteen section " Ideal " boilers, have been installed in the T. Range Stokehold, in place of two ten section H. type " Ideal " boilers, which had become obsolete after years of service. The new boilers should provide adequate heat which is essential in the majority of the Orchid and T. Range Houses.

House No. 14c has been overhauled, new lights fitted where necessary at the gable ends, and repainted inside. The partition in this house was badly decayed and was taken down, and the middle concrete stage was extended, thus making more room available to house some of the newly imported Orchids received during the past two years.

Our Orchid collection was greatly enriched during 1952, over fifty new species were added to the collection. The majority of the consignments

came by air transport, and in general they arrived in good condition. The plant of Ypsilopus longifolia received from P. G. Archer—is probably the first time this Orchid has been recorded in cultivation. Orchid donations were received from the following :—Mrs. G. K. Roth, Fiji—H. Q. Levy, Jamaica, B.W.I.—Miss Gregory, Nigeria—P. G. Archer, Nairobi—Professor A. S. Boughey, Gold Coast—Dr. T. Norman, India—Copenhagen Botanic Garden, and Singapore Botanic Garden.

Ferneries

During the year we received from Prof. R. E. Holttum a valuable collection of Ferns, comprising over 130 species, collected by him in the Taiping Hills, Malaya, Frasers Hill, and Singapore areas. Many of the species received have not been represented in the Kew collection before. When these plants are established, material will be supplied to Professor I. Manton, Leeds University, for cytological examination.

This season we have succeeded in raising many of the more difficult tree ferns from spores e.g. Alsophila australis, A. cooperi, Cyathea medullaris, C. sinuata, and Hemitelia smithii. Cuttings of Lycopodium pinifolium, which are not easy to root, have been successfully rooted.

No. 1 *House*

The four permanent beds were resoiled during the summer months, many of the old overgrown plants were taken out to give more head room and replaced by smaller specimens.

The hot water pipes in this house were overhauled, cleaned, and new pipes fitted where necessary.

No. 5 *House*

The collection of Cacti and succulent plants has improved vastly since they were renovated, and potted on into larger receptacles two years ago. Many of the Aloes and Euphorbias flowered better than they have for years.

Quarantine House

The propagation of Bananas, Cacao and Rubber, continued throughout the year. 123 Banana suckers were produced, over 523 leaf cuttings of Cacao were rooted, 1,166 Rubber plants raised from seed.

Plants despatched

6 Musa lacatan to the Gold Coast Agricultural Dept.

50 Musa East African spp. to the Imperial College of Tropical Agriculture, Trinidad.

55 I.C.S., P.A. and N.A. clones of Cacao to the Department of Agriculture, Peradeniya, Ceylon.

63 I.C.S., P.A. and N.A. clones of Cacao to the Department of Agriculture, Nigeria.

35 I.C.S. clones of Cacao to the Department of Agriculture, Kuala Lumpur.

517 Rubber seedlings to the Rubber Research Institute, Ceylon.

289 Rubber seedlings to the Department of Agriculture, Ibadan, Nigeria.

360 Rubber seedlings to the Rubber Research Institute, Malaya.

The exceptionally heavy fog experienced on December 5th, 6th and 7th was the worst for many years. It did a vast amount of damage to practically all the plants under glass, partially defoliating many of the tropical and subtropical species. Many plants later showed signs of die back, especially the young rooted plants of cacao in the Quarantine House. The Orchid flowers and buds on the plants in the show house were practically all destroyed. It chiefly affected the Angraecums, Calanthes, Cattleyas, Coelogynes, and Paphiopedilums. The fibrous rooting Begonias, Impatiens, Plumbagos, Plectranthus, and Coleus in Houses Nos. 7 and 8 were denuded of all their flowers.

Conclusion

It is pleasing to record that despite the wet August and September which considerably affected the attendances, the total figure of 1,188,925 was only a decrease of 17,032 over the previous year. The Sunday pilgrimage to Kew continues to be popular as instanced by the total Sunday attendance of 439,233 as against the total on weekdays of 749,692. The month of April when the spring flowers are at their best yielded the highest attendance of 306,504 whilst the greatest on one day was that on Easter Monday (14th April) when 56,215 people passed through the turnstiles.

Ecomomic Botanist

Sir Geoffrey Evans held this post throughout the year.

No visits to overseas territories were made during the year under report. He was a member of the XIII International Horticultural Congress which held its meetings in London from the 8th—14th September, and read a paper entitled "Variety Collections of Tropical Crops." On 28th June he visited the Bonar Law Memorial College at Ashridge, Herts., and lectured before the summer school on the 'Economic Resources of the British West Indies'.

He continued to deal with matters of economic consequence emanating from the Colonies and Overseas, and remained in general control of plant quarantine work.

For reasons given in previous reports, the number of tropical economic plants arriving and leaving Kew continues to increase on account of plant material required by the Research Stations in the Colonies, that are now carrying out plant breeding in certain important crops. The main crops we are concerned with are rubber, cocoa and bananas. The new Quarantine House which was opened last year for rubber and cocoa, has been filled to capacity. It has proved very suitable for cocoa propagation, but is not really high enough for rubber. Hevea plants grow tall rapidly, and reach the roof before the stems have really reached sufficient girth to permit of satisfactory patch budding. Some success was met in establishing budded stumps direct from Malaya, but all attemps at patch budding with ribbons imported from Kuala Lumpur have failed. At first it was thought that the ribbons might have been chilled during the journey by air. But special precautions to avoid chilling, either in the air or at the airports, were taken, and the results still remained unsatisfactory. It has been suggested that the growing points of the

buds may have been damaged owing to the low atmospheric pressure reached by modern planes flying at very high altitudes. A number of seeds of species and varieties of *Hevea* were received from America and germinated at Kew. After germination the seeds are examined for any signs of disease, and immediately packed in boxes and despatched to their final destination. By using this method, losses have been very small. A technique for raising rubber plants from cuttings is now being developed, and preliminary results are promising.

Cocoa is being propagated by means of leaf cuttings, a method which permits of rapid multiplication. There were big demands for Trinidad and Amazonian clones from Nigeria, Gold Coast, Malaya and Ceylon. Other places such as Fiji and Samoa have also asked for plants, but the transfer of material to these countries is rather a problem, as the most careful timetables will have to be worked out to avoid delays at airports which can prove fatal to plants in transit. A consignment of *Musa* species and varieties, mostly of East African origin, were despatched to the Banana Research Station at Trinidad during the summer, thereby relieving congestion in the Banana House.

The Economic Botanist sat as a member of various sub-committees of the Colonial Advisory Council for Agriculture, Forestry and Animal Health, and he was Chairman of the Anti-Locust Research Committee. He also continued as Chairman of the National Pinetum Committee, and paid various visits to Bedgebury, where several improvements came into effect.

Publications

Sir Edward Salisbury. Downs and Dunes, pp. xiii-328 with 32 plates and 100 Text Figs. Bell & Sons ; Natural Selection and Plant Invasions. Trans. S. African Association for the Advancement of Science ; Seed Variation and its significance. Proc. International Horticultural Congress ; Obituary of Francis Wall Oliver. Obituary Notices of Fellows of the Royal Society, pp. 231–240; The Royal Botanic Gardens, Kew. Discovery, pp. 318–321.

N. L. Bor. Notes on Asiatic Grasses : I. *Danthonia* DC. in India, in Kew Bull. **1952,** 75 (1952) ; ditto : II. The genus *Apocopis* Nees, l.c., 101 ; ditto : III. New names in *Poa* Linn. l.c., 130 ; ditto : IV. What is the correct name of *Capillipedium assimile*? l.c., 165 ; ditto : V. The genus *Microstegium* in India and Burma, l.c., 209 ; ditto : VI. A new species of *Poa*, l.c., 223 ; ditto : VII. *Coelachyrum* Hochst. l.c. 225 ; ditto : VIII. The genus *Eremochloa* Büse. l.c., 309 ; ditto : IX. The genus *Lopholepis* Decne. l.c., 317 ; ditto : X. A confused species of *Isachne*. l.c., 321 ; The genus *Poa* Linn. in India, pt. I, in Journ. Bomb. Nat. Hist. Soc. **50,** 787 (1952).

W. B. Turrill. Wild and cultivated olives, in Kew Bull. **1951,** 437 - 42 (1952) ; Notes on African Oleaceae I and II. l.c., **1952,** 133–6 (1952) ; A new species of *Fritillaria* from the Himalaya, l.c., 283–4 ; Methods of the experimental ground in relation to taxonomy, l.c., 427–37 ; Flora of Tropical East Africa, *Oleaceae* (1952) ; Some problems of plant range and distribution, in Journ. Ecol. **39,** 205 - 27 (1951, publ. 1952) ; Some taxonomic aims, methods, and principles, Nature. **169,** 388–93 (1952).

F. N. Howes. The Caesalpinias as Tanning Materials, in Materiae Vegetabiles **1,** 60–74 (1952).,

C. R. Metcalfe. *Medusandra richardsiana* Brenan. Anatomy of Leaf, Stem and Wood, in Kew Bull. **1952,** 237–44 ; 1952 ; Notes on the Anatomy of *Heptacodium*, l.c., 247–51 ; Notes on the Anatomy of the Leaf and Stem of *Anisophyllea guianensis* Sandwith, l.c., 291–3 ; Monocotyledons for Anatomical Investigation, Taxon. 1 : No. 8, 127–32, 1952.

E. M. Marsden-Jones and W. B. Turrill. Studies on *Ranunculus ficaria*, in Journ. Genetics 50, 522–34 (1952) ; Studies in *Ranunculus* IV. l.c., 51, 26–31 (1952).

F. Ballard. *Lycopodium carolinianum* in Tropical Africa. Amer. Fern Journ. **40,** 74–83 (1950).

G. R. Bisby and R. W. G. Dennis. Notes on British Hysteriales, in Trans. Brit. Mycol. Soc. **35,** 304–307 (1952).

R. A. Blakelock. *Diapensia lapponica* L. : its occurrence in Scotland, in Kew Bull. **1951,** 325–6 (1952) ; " British Flowers in Colour ", advisory editor B. L. Burtt, chapters on " Heath, Bog and Moor ", and " Marsh and Water-plants ", 72–80, 81–93.

J. P. M. Brenan. Notes on African Commelinaceae, in Kew Bull. **1952,** 179–208 (1952) ; Plants of the Cambridge Expedition, 1947–1948 : II, l.c., 227–236.

A. A. Bullock. South African poisonous plants, in Kew Bull. **1952,** 117–29 (1952) ; Notes on African Asclepiadaceae : I, l.c., 405–426.

R. W. G. Dennis. Some Tropical American Agaricaceae referred by Berkeley & Montagne to *Marasmius*, *Collybia* or *Heliomyces*, in Kew Bull. **1951,** 387–410 (1952) ; A new British *Clavaria*, in Kew Bull. **1952,** 40 (1952) ; Some fungi erroneously ascribed by Persoon to the Discomycetes, l.c., 301–302 ; An *Unguiculella* on a *Meliola*, l.c., 324; The *Laschia* complex in Trinidad and Venezuela, l.c., 325–332 ; The author of *Inocybe geophylla* var. *lateritia*, l.c., 437–438 ; Contribution towards a Fungus Flora of the small Isles of Inverness, in Trans. & Proc. Bot. Soc. Edinburgh, **36,** 58–70 (1952) ; The genus *Trogia* in India, in Indian Phytopathology **4,** 119–122 (1952) ; Biological Races and their taxonomic treatment by mycologists, in Proc. Linn. Soc. London, Session **163,** 47–53 (1952).

R. W. G. Dennis and M. B. Ellis. *Capnodium footii* and *Strigula babingtonii* in Trans. Brit. Mycol. Soc. **35,** 196–200 (1952).

B. de Winter. A Morphological, Anatomical and Cytological study of *Potomophila prehensilis* (Nees) Benth. Bothalia **6,** 117 (1951) ; The Taxonomy, Anatomy and Cytology of *Pseudobromus africanus* (Hack.) Stapf, Bothalia, **6,** 139 (1951).

C. I. Dickinson. Marine Algae from the Gold Coast : IV, in Kew Bull. **1952,** 41–3 (1952) ; Collectors who have contributed British and Irish specimens to the Algal Herbarium of the Royal Botanic Gardens, Kew, to the year 1910 in Brit. Phycological Bull. no. 1, 11–13 (1952).

J. B. Gillett. The genus *Trifolium* in southern Arabia and in Africa south of the Sahara, in Kew Bull. **1952,** 367–404 (1952).

S. G. Harrison. A note on Pseudohermaphrodism in *Daphniphyllum macropodum* Miq., in Kew Bull. **1951,** 369–370 (1952) ; Edible Pine Kernals, l.c., 371–375.

C. E. Hubbard. *Spartochloa*, a new genus of Australian grasses, in Kew Bull. **1952,** 307 (1952) ; *Whiteochloa*, a new genus of grasses from the Northern Territory of Australia, in Proc. Roy Soc. Queensland, **62,** 109 (1952). A new genus of *Gramineae* from tropical Africa in Bull. Jard. Bot. Brux. **22,** 313 (1952), with J. Léonard.

R. W. J. Keay. Notes on tropical West African species of Combretum : II, in Kew Bull. **1952,** 131–132 (1952) ; Revision of the Flora of West Tropical Africa, I, l.c., 149–165.

Patricia Lewis. On the Flora of Kuweit : II, (with B. L. Burtt) in Kew Bulletin, **1952,** 333–352 (1952).

R. D. Meikle. *Eriocaulaceae* and *Xyridaceae* in Liberia (with J. T. Baldwin, Jr.) in American Journ. Bot. **39,** 44–51 (1952) ; A new British Flora (review), in Kew Bull. **1952,** 252–254 (1952) ; Irish Botany and the new Flora, in Irish Naturalists' Journ. **10,** 306–8 (1952) ; *Salix calodendron* Wimm. in Britain, Watsonia, **2,** 243–248 (1952) ; *Onopordon insigne* in Gard. Chron. 1952, 5.

R. Melville. Two Allies of *Epacris heteronema* Lab., in Kew Bull. **1952,** 175–178 (1952) ; *Trianthema pentandra* L. and some related species, l.c., 261–269.

E. Milne-Redhead. Notes on African Marantaceae : II and III, in Kew Bull. **1952,** 167–170 (1952) ; Flora of Tropical East Africa, Marantaceae (1952).

E. Milne-Redhead and W. B. Turrill. Flora of Tropical East Africa. Ranunculaceae (1952).

E. Nelmes. Notes on Cyperaceae : XXVI, in Kew Bull. **1951,** 319–321 (1952) ; ditto : XXVII, l.c., 419 ; ditto : XXVIII. An addition to the *Carex flava* group of sedges, l.c., **1952,** 67–68 (1952) ; ditto : XXIX. A new Sumatran *Carex* of Subgen. *Vignea*, l.c., 83–84 ; ditto : XXX, l.c., 289 ; Submersed species of *Eleocharis* with 1-flowered spikelets, l.c., 289–290 ; A hybrid *Carex* from Wales, in Watsonia, **2,** 148–150 (1952) ; Notes on British Carices, VIII : *Carex filiformis* L., l.c., 249–252 ; *Cyperaceae* in Liberia (with Prof. J. T. Baldwin), in American Journ. of Bot., **39,** 368–393 (1952).

N. Y. Sandwith. Contributions to the Flora of Tropical America : LIII., in Kew Bull. **1952,** 249 251 (with C. E. Kobuski) ditto : LV., 303–306 ; A mysterious *Carex* on Ben Lawers, in Watsonia, **2,** 279–281 (1952).

H. K. A. Shaw. On the Dioncophyllaceae, a remarkable new family of Flowering Plants, in Kew Bull. **1951,** 327–347 (1952).

Margaret Y. Stant. Anatomical Evidence for including *Nyctanthes* and *Dimetra* in the Verbenaceae, in Kew Bull. **1952,** 273–76 (1952).

V. S. Summerhayes. African Orchids, XX, in Kew Bull. **1951,** 461–475 (1952).

Jane Taylor. A Contribution to the Bryophytic Flora of the Nearer East, in Kew Bull. **1952,** 45–60 (1952).

Barbara J. Youngman. Professor Naonori Hirota's Work on Camphor Trees, in Kew Bull. **1952,** 61–65 (1952).

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SOME PLEUROTOID FUNGI FROM THE WEST INDIES.

R. W. G. Dennis.

The following notes should be read in conjunction with those on Trinidad *Lentinus* in Dennis (1950) as a few species commonly referred to that genus have somewhat excentric stipes at maturity.

Pleurotus (*Fr.*) *Kummer*, Führer Pilzk. pp. 24 & 104 (1871).

Type species : *Agaricus ostreatus* Jacq. ex Fr.

Key to species :—

I Flesh gelatinous or with a gelatinous layer

A Small white species without cystidia, spores tearshaped (*Scytinotus* Karst.) *P. distantifolius*

B Larger coloured species with thick-walled cystidia (*Acanthocystis* Fayod)

1. Pileus hairy *P. barbatulus*
2. Pileus smooth *P. subbarbatus*

II Flesh without a gelatinous layer

A. Pileus brown, with an excentric or lateral stipe :

1. Gills crowded, spores 3 × 2μ *P. brunnescens*
2. Gills distant to subdistant, spores 7–10μ long
See *Marasmiellus*, p. 40

B. Pileus bright yellow *P. flavolanatus*

C. Pileus white or whitish

1. Cheilocystidia present
 a. Cheilocystidia *Marasmius*-like, spores 13–16 × 3·5–4μ *P. griseo-roseus*
 b. Cheilocystidia Ninepin-shaped, spores 7–8 × 3μ *P. catephes*
 c. Cheilocystidia cylindrical, spores 5·5–7 × 2·5–3μ
See *Marasmiellus inconspicuus* p. 40
2. No cystidia
 a. Pilei large, imbricate, spores 8–10 × 3μ . . *P. eugrammus*
 b. Pilei 1–4 cm. diameter with a short lateral stipe, spores 4–6 × 2·5–3μ *P. hygrophanus*
 c. Pilei seldom over 1 cm. diameter, or if larger then sessile or resupinate
 Spores subglobose 4–5 × 3·5–4μ . . . *P. candidissimus*
 Spores elliptical, longer
 *Pileus stalked, spores 7–8 × 3–4μ . . *P. dictyorhizus*
 **Pileus sessile or resupinate
 †Spores 7–8 × 4–4·5μ *P. chioneus*
 ††Spores 5–7 × 3·5–4·5μ *P. subhaedinus*

Pleurotus distantifolius (*Murrill*) *Dennis*, comb. nov.

Scytinotus distantifolius Murrill in N. American Flora **9,** 239 (1915).

Marasmius distantifolius (Murrill) Murrill in Mycologia **7,** 156 (1915).

Pileus circular with incurved margin, soon becoming reniform, convex, pruinose, pure white ; flesh thin, white, gills broad, distant, much forked and interveined, white ; stipe very short, at first central, white, pruinose, soon becoming lateral. Pileus surface covered with short, erect, nodulose hyphal branches about 2μ wide, tramal hyphae about 2μ wide with clamp connections, loosely woven in a gelatinous matrix, no pleurocystidia, gill edge sterile with diverticulate hyphae like the pileus surface, basidia cylindric-clavate, about 25 × 5μ, fourspored, spores tear-shaped, 12–14 × 2·5–4μ. Gregarious on dead sticks and herbaceous stems. Fig. 1.

Collections seen :—Jamaica : on herbaceous stem, Castleton, 16. XII.1949, *Dennis* J 2 ; Puerto Rico : on sticks, Rio Piedras, 25.V.1913, *J. R. Johnston* 927 (Typus).

Though Murrill described the fungus as resupinate and sessile all three sporophores in the type collection have well developed stipes. In its diverticulate hyphae and tearshaped spores the species shows affinity with *Marasmius*, as already recognised by Murrill.



Fig. 1. *Pleurotus distantifolius*. Left: immature and mature sporophores × 3½, spore × 660. Right : diverticulate hyphae of the pileus surface (P) and gill edge (C) × 660.

Pleurotus barbatulus (*Berk. et Curt.*) *Sacc.* Syll. fung. **5,** 377 (1887).

Agaricus barbatulus Berk. et Curt. in Ann. Mag. Nat. Hist. ser. 3, **4,** 287 (1859).

Resupinatus subbarbatulus Murrill in N. American Flora **9,** 241 (1915).

Pleurotus subbarbatulus (Murrill) Murrill in Mycologia **7,** 156 (1915).

Pileus up to 4 cm. diameter, elliptical, becoming semicircular with undulating margin, flat, surface tomentose, vinaceous buff, paler at the margin ; flesh with a gelatinous gray zone under the upper surface, remainder white ; gills crowded, of several lengths, decurrent, narrow, cartridge buff ; stipe wanting, pileus laterally attached from the first. Spores elliptical, 6–7 × 3μ, print white ; cheilo- and pleurocystidia abundant, fusiform, thickwalled, pointed, 50–80 × 15μ ; pileus surface covered with erect hairs, gelatinous layer of loosely woven hyphae 2–2·5μ wide, underlying trama of hyphae 2–4μ wide, with clamp connections. Fig. 2.

On logs and stumps.

Collections seen :—Trinidad : Non Pareil, Sangre Grande, 19.X. 1949, *Dennis* 197 ; Cuba, *Wright* 44A ; Mexico : Xuchiles, Cordoba, 17.1.1910, *W. A. Murrill* 1142 (Typus of *R. subbarbatulus*) ; U.S.A., Boston, *Murray* 6390 (Typus).

This seems to be the tropical representative of *P. petaloides* (Bull. ex Fr.) Quél. Judging by the description *P. cinereo-albus* Pat. et Gaill. 1888 from the Orinoco may also be a synonym.

Pleurotus subbarbatus (*Berk. et Curt.*) *Sacc.* Syll. Fung. **5,** 383 (1887).
Agaricus subbarbatus Berk. et Curt. in J. Linn. Soc. Bot. **10,** 288 (1869).
Resupinatus subbarbatus (Berk. et Curt.) Murr. in N. American Flora **11,** 242 (1915).
Hohenbuehelia subbarbata (Berk. et Curt.) Singer in Lilloa **22,** 255 (1951).



FIG. 2. *Pleurotus barbatulus*. Sporophore from above and radial section, natural size; diagrammatic section of pileus trama slightly enlarged showing the tomentose surface, gelatinous layer and lowermost compact nongelatinised tissue ; on left cystidium and spore × 660.

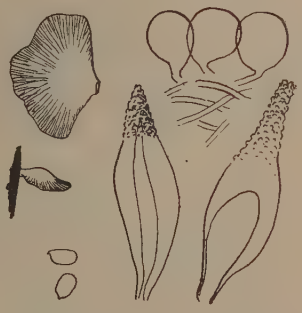


FIG. 3. *Pleurotus subbarbatus*. Left: pilei viewed from above and laterally ; above : section of pileus cuticle × 660 ; below: spores and cystidia × 660.

Pileus 1–2 cm. diameter, semicircular, arched or flattened, margin undulating, fuscous to fuscous-black, closely translucently striate, smooth; flesh dark gray, entirely gelatinous ; gills decurrent, crowded, narrow, concolorous ; stipe wanting, pileus laterally attached from the first. Spores elliptical, 5–6 × 3μ, print white, non-amyloid ; cheilo and pleurocystidia abundant, ventricose, apex hyaline and encrusted, base brown, very thick-walled, 40–50 × 12–14μ ; tramal hyphae 2μ wide, embedded in a gelatinous matrix, pileus surface formed of globose to pyriform thin-walled cells about 10μ across, with gray-brown sap. Fig. 3. On sticks and dead wood.

Collections seen :—TRINIDAD : River Estate, Diego Martin, 22.IX. 1949, *Dennis* 26 ; Non Pareil, Sangre Grande, 19.X.1949, *Dennis* 26A ; CUBA, *Wright* 808 (Typus).

Pleurotus brunnescens (Earle) Dennis, comb. nov.
Micromphale brunnescens Earle in Inf. An. Estaç. Centr. Agron. Cuba **1,** 235 (1906).

Pileus up to 4 cm. diameter, hemispherical becoming convex and flattened at the disc, verona brown, smooth ; flesh thin, concolorous ;

gills crowded, narrow, of several lengths, adnato-decurrent, cartridge-buff ; stipe equal, central, then soon becoming excentric, paler than the pileus and whitish at the base, tomentosely fibrillose with white fibrils when young but there is no veil even in young sporophores only 2 mm. high, becoming hollow, mycelium white, thread-like. Spores elliptical, 3 × 2μ, guttulate, non-amyloid, basidia 5μ wide, fourspored, gill edge fertile, no cystidia ; pileus surface of rather loosely woven hyphae 2–3μ wide overlying a brown compact layer, remainder of the trama of loosely woven hyphae. Fig. 4.

Collections seen :—Trinidad : on mould adhering to very rotten log in forest, Morne Bleu, 4.XII.1949, *Dennis* 419 ; Cuba : Guanajay, 2.X.1904, *van Herman* 282 (part of the typus in Herb. New York Bot. Gard.). Those who recognise *Marasmiellus* may wish to refer the species to that genus.



Fig. 4. *Pleurotus brunnescens*. Sporophores and sections, natural size, spores × 660.

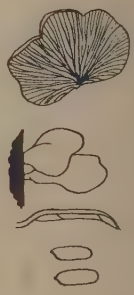


Fig. 5. *Pleurotus flavolanatus*. Sporophores from below, from the side and in radial section, natural size, spores × 660.

Pleurotus flavo-lanatus (*Berk. et Curt.*) *Sacc.* Syll. Fung. **5,** 376 (1887).

Agaricus flavo-lanatus Berk. et Curt. in J. Linn. Soc. Bot. 10, 288 (1869).

Pileus up to 1·5 cm. diameter, semicircular, convex, becoming flattened with a lobed margin, finely tomentose, chamois ; flesh thin, whitish ; gills crowded, decurrent, of four lengths, very narrow, concolorous ; stipe wanting, pileus laterally attached to a patch of white mycelium. Spores elliptic-cylindric, 7–9 × 3μ, spore print white, non-amyloid, gill edge fertile, no cystidia, pileus surface of felted hyphae 4–5μ wide with clamp connections. Fig. 5.

Collections seen :—Trinidad : on dead *Heliconia* stems, Cerro del Aripo, c. 1100 ft., 23.X.1949, *Dennis* 226 ; Cuba, *Wright* 143, on sticks (Typus).

Pleurotus griseo-roseus (*Mont.*) *Sacc.* Syll. Fung. **5,** 386 (1887).

Agaricus griseo-roseus Mont. in Ann. Sci. Nat. Bot. ser 4, **1,** 98(1854).,

Pileus up to 5 mm. diameter, reniform, dorsally attached at a point, smooth, dry, white, drying pale buff ; flesh very thin, white, soft ; gills few, distant, broad, forked and sparingly interconnected, concolorous ;

stipe wanting. Spores tearshaped with one or two large guttules, 13·5–15·5 × 3·5–4μ, basidia about 20 × 5μ. Cheilocystidia thin-walled, hyaline, pyriform, crowned by numerous short, obtuse, processes, no pleurocystidia ; tramal hyphae thinwalled, closely woven, red-brown in Melzer's reagent, subhymenium thin, compact, pileus surface a hymeniform layer of smooth pyriform cells. Fig. 6.

Collections seen :—TRINIDAD : on rotten trunk (? a palm), Siparia Forest Reserve, 5.XI.1949, *Dennis* 297 ; FRENCH GUIANA, on rotten branches, *Leprieur* 1018 (Typus). This is evidently a resupinate *Marasmius*.

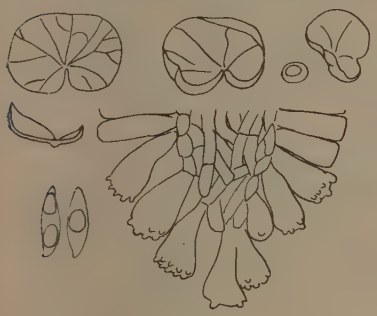


FIG. 6. *Pleurotus griseo-roseus*. Above : four sporophores and radial section × 4, below : spores and section of gill edge × 660.

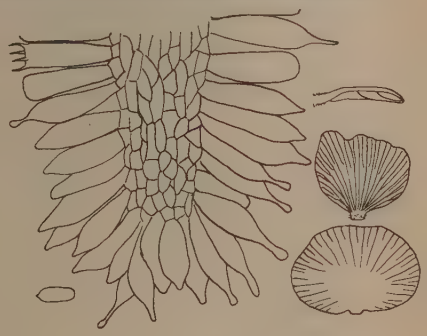


FIG. 7. *Pleurotus catephes*. Left : spore and section of gill edge × 660 ; right : radial section and sporophores from below and above, natural size.

Pleurotus catephes (*Berk.*) *Sacc.* Syll. Fung. **5,** 365 (1887).

Agaricus catephes Berk. in Ann. Mag. Nat. Hist. ser 2, **9,** 192 (1852).

Geopetalum catephes (Berk.) Murrill in N. American Flora 9, 302 (1916).

Pileus up to 2 cm. diameter, spathulate to reniform, flattened, smooth, dry, striate, white, drying yellow with conspicuous darker striae ; flesh thin, white, tough ; gills adnate, narrow, distant to subdistant, of three lengths, white ; stipe lateral, rudimentary, white, tomentose. Spores elliptic-cylindric, 7–8 × 3μ, print white, non-amyloid, basidia four-spored, about 20 × 7–8μ, cheilocystidia thinwalled, ventricose with a slender capitate-beak, about 14 × 6–7μ, no pleurocystidia ; trama of closely woven thin-walled hyphae reddish-brown in Melzer's reagent, pileus surface of interwoven hyphae 4μ wide. Fig. 7.

Collections seen :—TRINIDAD, on *Heliconia* stems, Cerro del Aripo 23.X.1949, *Dennis* 226 B ; VENEZUELA, on *Hedychium* stems, Rancho Grande, Maracay, 19.XI.1949, *Dennis* 342 ; SAN DOMINGO, *Sallé* No. 12 (Typus).

Pleurotus eugrammus (*Mont.*) Dennis, comb. nov.

Agaricus eugrammus Mont. in Ann. Sci. Nat. Bot. ser 2, **8,** 366 (1837).

Lentinus eugrammus (Mont.) Mont. Pl. Cell. Cuba 414 (1842).

Panus eugrammus (Mont.) Fr. in Nova Acta Soc. Sci. Upsal. ser 3, **1,** 40 (1851).

Panellus eugrammus (Mont.) Murrill in N. American Flora **9,** 245 (1915).

Agaricus lobulatus Lév. in Ann. Sci. Nat. Bot. ser 3, **5,** 116 (1846).
Pleurotus lobulatus (Lév.) Sacc. Syll. Fung. **5,** 371 (1887).
Panus wrightii Berk. et Curt. in J. Linn. Soc. Bot. **10,** 299 (1869).

Pileus sessile, imbricate, up to 10 cm. diameter, convex, becoming flattened, surface smooth in front, becoming finely tomentose behind, pure white, drying ochraceous ; flesh of moderate thickness, tough, white ; gills rather crowded, of three or four lengths, broad, concolorous. Spores elliptic-cylindric, 7–10 × 3–3·5μ, print white, non-amyloid, basidia about 15 × 5μ, no cystidia, pileus surface of interwoven, rather thick-walled hyphae, 4–5μ wide, tramal hyphae similar, interwoven, with sharp bends at intervals. Fig. 8. On dead wood.

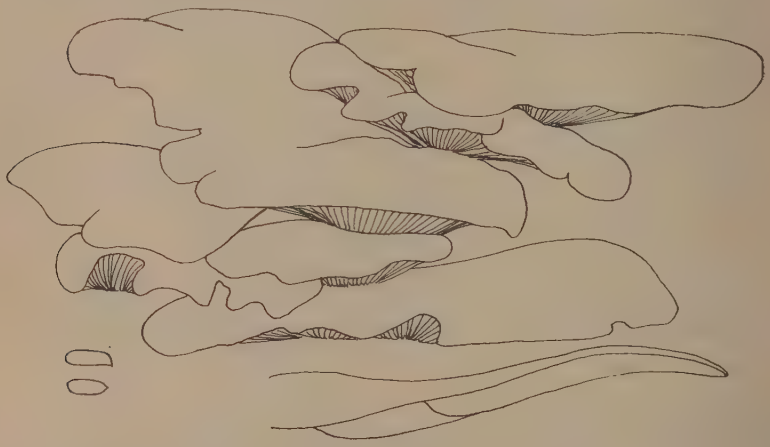


Fig. 8. *Pleurotus eugrammus*. Habit sketch and radial section, natural size, spores × 660.

Collections seen :—Cuba, authentic specimen from Montagne in Herb. Berkeley ; *Wright* 119, 35, 14 as *P. eugrammus* ; *Wright* 42 as *P. wrightii* ; Trinidad : Grande Riviere, *Baker* 1465, 15.VI.1947, as *Pleurotus flabellatus* Berk. et Br. ; Summit of northern range N. of Arima 25.IX.1949, *Dennis* 71 ; Venezuela : Herb. Berk. No. 54 as *Pleurotus flabellatus* ; Brazil : typus of *P. lobulatus* in Herb. Paris ; Grand Cayman, Georgetown, on *Bursera simaruba*, *C. B. Lewis*, 26.XII. 1944.

Murrill evidently applied the name *Panellus eugrammus* to the following species for he gives the spore size as 6 × 3μ and the colour as pallid to reddish cervinous. The authentic material from Montagne in Berkeley's herbarium seems, however, to be the fungus described above, as does his figure in Ramon de la Sagra, Flora Cubana IV tab. XVII fig. 2, 1853.

Pleurotus hygrophanus (*Mont.*) Dennis, comb. nov.
Panus hygrophanus Mont. in Ann. Sci. Nat. Bot. ser 4, **1,** 96 (1854).
Agaricus hemiphlebius Berk. et Curt. in J. Linn. Soc. Bot. **10,** 288 (1869).
Pleurotus hemiphlebius (Berk. et Curt.) Sacc. Syll. Fung. **5,** 369 (1887).

Pileus up to 4 cm. diameter, convex, becoming flattened with a sharply decurved margin, surface smooth, dry, white but in young sporophores

the disc may be dark purplish-brown with concolorous radiating fibrils ; flesh very thin, white, blackening in spots with age, fibrous, tough, becoming translucent and very brittle when dried ; gills distant, broad, rather thick, slightly interveined and sometimes forked towards the margin, of two or more lengths, white ; stipe excentric, soon becoming lateral, short, white, equal, solid. Spores elliptical, 4–6 × 2–3μ, non-amyloid, print white, basidia small, narrow, fourspored, no cystidia, tramal hyphae 3–4μ wide with rather thick hyaline walls, pileus surface of similar more or less radiating hyphae. Gregarious on dead wood. Fig. 9.

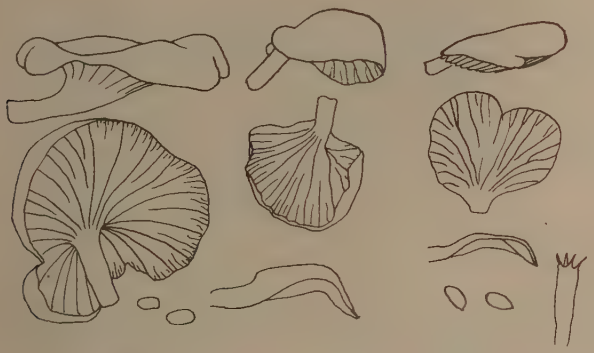


FIG. 9. *Pleurotus hygrophanus*. Sporophores and radial sections natural size, spores and basidium × 660.

Collections seen :—FRENCH GUIANA, *Leprieur* 1016, authentic specimen from Montagne in Herb. Berkeley ; TRINIDAD : crest of northern range N. of Arima, 25.IX.1949, *Dennis* 68 ; on dead bamboo, St. Joseph 14.X.1949, *Dennis* 68A ; Arena forest 5.X.1949, *Dennis* 130 ; path between North Post and Maqueripe trail 27.X.1949 ; Mt. Tucuche 6.VI.1947 *R. E. D. Baker* 1451 ; CUBA, *Wright* 49 (Typus of *Ag. hemiphlebius*) ; FLORIDA, Reliq. Farlowianae 987 as *Nothopanus eugrammus* (Mont.) Sing.

Possibly *Geopetalum eugeniae* Earle may also be this fungus but of it I have seen only a photograph preserved at New York Botanic Garden,it had spores 5 × 3μ.

Pleurotus candidissimus (*Berk. et Curt.*) *Sacc.* Syll. Fung. **5,** 368 (1887).

Agaricus candidissimus Berk. et Curt. in Ann. Mag. Nat. Hist. ser 3, **4,** 288 (1859).

Geopetalum candidissimum (Berk. et Curt.) Murrill in N. American Flora **9,** 298 (1916).

Agaricus haedinus Berk. et Curt. J. Linn. Soc. Bot. **10,** 288 (1869).

Pleurotus haedinus (Berk. et Curt.) Sacc. Syll. Fung. **5,** 369 (1887).

Geopetalum haedinum (Berk. et Curt.) Murrill in N. American Flora **9,** 301 (1916).

Geopetalum subelatinum Murrill in N. American Flora **9,** 301 (1916).

Pleurotus subelatinus (Murrill) Murrill in Mycologia **8,** 218 (1916).

Pileus up to 8 mm. wide, circular to reniform or irregularly lobed, dorsally attached, surface minutely tomentose, white ; flesh thin, soft, white ; gills of three lengths, rather broad and crowded, white, stipe rudimentary, lateral, soon obliterated, white, pruinose. Spores subglobose, 4–5 × 3·5–4μ, print pure white, non-amyloid, basidia fourspored, 15–18 × 5 6μ, no cystidia, tramal hyphae compact, thinwalled, 3μ wide, pileus surface of loosely woven thinwalled hyphae 5μ wide. On rotten wood. Fig. 10.



Fig. 10. *Pleurotus candidissimus*. Sporophores × 3, tangential section approx. × 25, spores and section of gill edge × 660.

Collections seen :—Trinidad, Non Pareil, Sangre Grande, 19.X.1949, *Dennis* 208 ; Cuba, Santiago de las Vegas, 11.XI.1904, *F. S. Earle* 192 (Typus of *G. subelatinum*), *Wright* 43 (Typus of *P. haedinus*) ; Maine, *Sprague* (Typus of *P. candidissimus*).

P. candidissimus as interpreted by Pilat (1935) has a wide distribution in Europe and North America. He cites as an additional synonym *Pleurotus leucochrius* Britz.

Pleurotus dictyorhizus (*DC.*) *Gillet*, Hyménomycetes 338 (1874).

Agaricus dictyorhizus DC. ex Fr. in Syst. Myc. **1,** 192 (1821).

Calathinus dictyorhizus (DC.) Quélet. Flore Mycol. France 191 (1888).

Pileus less than 1 cm. diameter, reniform, convex, finely tomentose, margin striate, white, drying buff ; flesh very thin, soft, white ; gills of two lengths, rather crowded, adnexed, white ; stipe slender, equal, excentric or lateral, about 2 × 0·5 mm. Spores elliptical, 7–8 × 3–4μ, basidia fourspored, 5μ wide, no cystidia, pileus surface of loosely woven hyphae 5–6μ wide. Fig. 11.



Fig. 11. *Pleurotus dictyorhizus*. Sporophores natural size, basidium and spore × 660.

Collections seen :—Trinidad : on dead herbaceous stems, L'Orange, Aripo Valley 13.X.1949, *Dennis* 173 ; on bamboo, St. Joseph, 18.X.1949, *Dennis* 173 A.

I have followed Pilat (1935) in thus interpreting this old European species.

Pleurotus chioneus (*Pers.*) *Gillet*, Hyménomycetes 336 (1874).

Agaricus chioneus Pers. in Mycologia europaea **3,** 28 (1828).

Pileus 1–2 cm. wide, spathulate or reniform, becoming flattened, surface minutely tomentose under a lens, pure white ; flesh thin, soft, white ; gills crowded, of three lengths, narrow, white, buff with age and drying ochraceous ; stipe wanting, or represented by a white, tomentose, lateral nodule. Spores elliptical, 7–8 × 4–5μ non-amyloid, basidia four-spored, 15–20 × 6–7μ, no cystidia, pileus surface of loosely woven, thin-walled hyphae 3–4μ wide, tramal hyphae similar. Fig. 12.

Collections seen :—Trinidad, on Savanna grass and on the ground under grass on a lawn, St. Augustine, 7.X.1949, *Dennis* 143 ; same locality 14.X.1949 ; on decaying *Trametes corrugata* (Pers.) Bres. on Mora log, Valencia forest, 16.X.1949, *Dennis* 181.

I have interpreted this variously understood species in the sense of Pilat (1935) who has observed that it is common on decaying polypores and on dead stems of herbs and grasses as well as on woody debris. It is evidently cosmopolitan.



Fig. 12. *Pleurotus chioneus*. Sporophores natural size, on left Dennis 143, on right Dennis 181, spores × 660.



Fig. 13. *Pleurotus subhaedinus*. Sporophore natural size and below young state × 4, pileus section × 25, section of gill edge and spores × 660.

Pleurotus subhaedinus (*Murrill*) *Murrill* in Mycologia **8,** 217 (1916).

Geopetalum subhaedinum Murrill in N. American Flora **9,** 302 (1916).

Pileus up to 2 cm. broad, reniform, laterally attached or resupinate, surface dry, white, smooth ; flesh thin, soft, white ; gills of three lenths, rather close, narrow, white, drying buff ; stipe wanting. Spores broadly elliptical 5–7 × 3·5–4·5μ, non-amyloid, basidia fourspored, 17 × 6μ, no cystidia, pileus surface and trama of very loosely woven hyaline hyphae 2–2·5μ wide, more compact in the gills. On dead wood. Fig. 13.

Collections seen :—Venezuela, on bark, Rio Chacaito, Caracas, 18.XI.1949, *Dennis* 371 ; Mexico, on log Xuchiles, Cordoba, 17.1.1910, *W. A.* and *E. L. Murrill* 1134 (Typus).

This fungus differs from *P. chioneus* only in its shorter spores and looser, softer texture and may be no more than a form of that species.

Marasmiellus *Murrill* in N. American Flora **9,** 243 (1915).

Type species : *M. juniperinus* Murrill.

This genus, hitherto largely ignored, has been revived by Singer (1951) and redefined to include many species formerly placed in *Marasmius*, *Mycena* or *Hemimycena*. In this emended sense it would embrace many fungi treated under *Collybia* by Dennis (1951b). Dr. Singer has kindly allowed me to include below the diagnosis of a new species already known to him from Guiana.

Marasmiellus inconspicuus *Murrill* in N. American Flora **9,** 243 (1915).

Marasmius inconspicuus (Murrill) Murrill in Mycologia **7,** 156 (1915).

Pileus up to 4 mm. across, convex, dry, smooth, margin downy when young, not striate when fresh, white, drying reddish-brown and then marked with close dark striae ; flesh thin, white, gills adnate, subdistant, of two lengths, narrow, white ; stipe rather stout, short, soon becoming excentric or lateral. Spores elliptic-cylindric, 5·5–7 × 2·5–3 μ, with a large oil drop, non-amyloid, basidia cylindrical, about 27 × 5μ, apparently twospored, cheilocystidia ventricose, 20–32 × 7–9μ, caulocystidia similar, pileus surface of broad, short-celled, thinwalled hyphae 10–16μ wide. Gregarious on dead wood. Fig. 14.

Collections seen :—Trinidad : on dead bamboo, River Estate, Diego Martin, 22.IX.1949, *Dennis* 19A ; on liana, Arena Forest 30.X. 1949, *Dennis* 267 ; Cuba, on sticks, Santiago de las Vegas, 11.IX.1904, *F. S. Earle* 191.

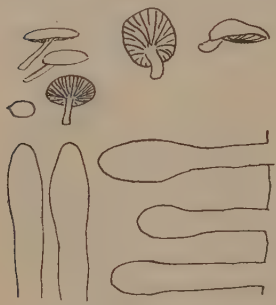


Fig. 14. *Marasmiellus inconspicuus*. Above: sporophores × 3. On left : spore and cheilocystidia ; right : hairs of the stipe, all × 660.



Fig. 15. *Marasmiellus juniperinus*. Sporophores natural size, spore and sterile cells × 660.

Marasmiellus juniperinus *Murrill* in N. American Flora **9,** 243 (1915).

Marasmius juniperinus (Murrill) Murrill in Mycologia **7,** 156 (1915).

Pileus 1·5–4 cm. diameter, reniform, imbricate, convex, smooth, dry, sayal brown to mikado brown ; flesh thin, tough, flexible ; gills subdistant, adnate, of three or four lengths, sometimes forked, broad, much interveined at maturity, cartridge buff ; stipe short, equal, excentric, solid, white, pruinose. Spores subglobose, 7 × 6·5μ, basidia four-

spored, gill edge of sterile hyphal tips but without specialised cheilocystidia, no pleurocystidia, pileus surface of rather loosely woven brown hyphae 3–4μ wide, with clamp connections, tramal hyphae similar but hyaline. On bark of trees.

Collections seen :—JAMAICA : Cinchona, Blue Mts. 25.XII.1908 to 8.I.1909, *W. A. and E. L. Murrill* 484 (Typus) ; John Crow Peak, Blue Mts. 26.XII.1949, Mr. Proctor, *Dennis* J 77. Fig. 15.

Murrill described the gills as " not interveined " but interveining is clearly developed in the type collection at New York Botanical Garden.

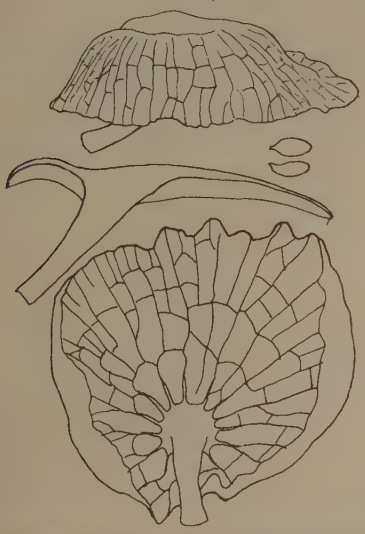


FIG. 16. *Marasmiellus laschiopsis*. Sporophore and section, natural size, spores × 660. Dennis 65.

Marasmiellus laschiopsis *Sing.*, spec. nov.

Pileo argillaceo (" mummy " vel " tiffin " Maerz & Paul), plus minusve striato-sulcato, minute tomentosulo, convexo, frequenter centro depresso, sed plerumque irregulariter formato, margine saepe undulato, inaequilaterali, usque ad 50 mm. lato. Lamellis pileo pallidioribus (prope " tanaura " Maerz & Paul), distantibus, irregulariter furcatis venisque sparsis vel subsparsis anastomosantibus, angustis aciem versum aliquantulum attenuatis, margine versus acutissime attenuatis, adnatis. Stipite lamellis concoloribus, sed purpureobrunneo (" kis kilim " vel " raw umber " Maerz & Paul) ad basin, minute pubescente vel tomentosulo-pruinoso, solido, basi subincrassato et in pileum dilatato, insiticio, excentrico, 20–22 × 2–3 mm. Carne alba, tenaci ; sapore notabili nullo. Sporis 6·8–9·7 × 3·2–4·2μ, oblongis, tenui tunicatis, guttulis nonnullis impletis, levibus, hyalinis, inamyloideis ; basidiis 22·5–23 × 5·5–6μ, clavatis, tetrasporis ; acie lamellarum ex elementis irregularibus nodoso-ramosis, diverticulatis et nonnullis dermatocystidia in mentem revocantibus efformata ; tramate hymenophorali regulari vel subregulari, ex elementos hyphalibus latis, voluminosis consistente ; sub-

hymenio bene evoluto, filamentoso-ramoso, ex elementis tenuissimis breviusculis efformato crassiusculo ; epicute pilei ex pilis dermatocystidioideis numerosissimis est haud palisadice dispositis, erectis, hyalinis, levibus, integris vel rarissime furcatis, et inter ea ramulis hypharum superficialium vel nodulorum ex eis projicientibus formato ; pilis dermatocystidioideis versiformibus, cylindraceis, fusoideis, ventricosis, subulatis, 15–53 × 4·2–9μ, saepe constrictis, saepe apice deformatis, cornutis, appendiculatis etc. ; hypodermio ex hyphis jacentibus filamentosis hinc illinc membrana pigmento incrustante aureo-melleo vel melleo colorata instructis ; hyphis omnibus inamyloideis fibuligeris. Ad ramos ramulosque dejectos putridos in silva pluviali. Fig. 16.

Collections seen : Trinidad : Northern Range, north of Arima, 25.IX.1949, *Dennis* 65 ; British Guiana : Bartica, 13.XII.1923, *Linder* 517.

The portion of Dennis 65 at Tucuman is the type, that at Kew the syntype and Linder's collection at the Farlow Herbarium is a paratype. This is a good and characteristic species which we place at the " fringe " of the section Rameales, where similar configurations of the hymenophore and excentrically stipitate forms have been observed before."

Micromphale *S. F. Gray*, Nat. Arrangement Brit. Plants **1,** 621 (1821).

This genus has already been dealt with in Dennis (1951b) but it has recently been emended by Singer (1951). He excludes all species with amyloid spores but adds a new nongelatinized section Rhizomorphigena, the type species of which he has recognised in my number 114. His detailed description of this fungus is printed below.

Micromphale brevipes (*Berk. & Rav.*) *Singer*, comb. nov.

Marasmius brevipes Berk. & Rav. in Ann. Mag. Nat. Hist. Ser. 2, **12,** 426 (1853).

Marasmius westii Murr. in Proc. Fla. Acad. Sc. **7,** 110 (1945).

Micromphale westii (Murr.) Sing. in Sydowia **2,** 32 (1948).

Pileus " fawn colour " or often paler than " fawn colour ", the centre reaching " Verona brown " (Ridgway), glabrous and naked, slightly to strongly radiately sulcate over the lamellae, convex, either not fully expanding or becoming applanate, often with somewhat depressed centre, 5–20 mm., broad. Lamellae concolorous with the margin of the pileus or " pale pinkish cinnamon " (Ridgway), sometimes almost pallid, distant (usually 9–10 through lamellae, not counting those forking away from the stipe) broad (1–1·2 mm.) adnate, often with not quite regularly intermixed lamellulae, but sometimes almost equal, often some forked ones present, sometimes with venose anastomoses ; spore print white. Stipe chestnut, more blackish below or sometimes all over, sometimes with castaneous-fulvous apex, glabrous, naked, smooth, sometimes even shining as in many Marasmii, insiticious or branching from black rhizomorphs and then often very long, otherwise short and curved, central or excentric, often strongly excentric and 1–4 × 1 mm. at the apex but tapering downwards ; rhizomorphs black and somewhat shining, thin, branching, covering the substratum, aerial, abundant.

Context membranous, very thin, subconcolorous when wet ; odour slight or distinct, of sauerkraut (like that of *Micromphale foetidum*) taste astringent (according to Murrill).

Spores (5·7) 6·5–8·8 × 3–4μ, ellipsoid, usually somewhat applanate on the inner side, smooth, hyaline, non-amyloid ; basidia 23–32 × 5·8 7·5μ, clavate, tetrasporous ; basidioles fusoid ; cystidia none ; cheilocystidia basidiomorphous to irregular, often rugulose-nodose, forked or branched, even diverticulate, 27–31 × 7·5–8·5μ ; epicutis of the pileus consisting of filamentous hyphae which are much less nodose and diverticulate than the cheilocystidia but showing some erect hyphal outgrowths, occasional nodose hyphal ends and scattered nodules, the structure being obscured by the strong incrusting amorphous incrustation often observed on the edge and the surfaces ; hypodermal hyphae strongly incrusted by an ochre brown pigment ; trama of the pileus consisting of loosely arranged hyphae but not gelatinized (Kühner's method) ; all hyphae with clamp connections, non-amyloid.

On fallen sticks and dead vines in mesophytic " hammocks " and in tropical rain forests, gregarious. Fig. 17.



Fig. 17. *Micromphale brevipes*. Sporophore and section natural size, spores × 660. Dennis 114.

Collections seen : South Carolina, U.S.A. : Santee Canal, June, on dead twigs of oak, *H. W. Ravenel* (Typus of *M. brevipes*) ; Florida, U.S.A.: Kelly's Hammock, west of Gainesville, 25.V.1943, R ; *Singer* F 2118 (in Farlow Herbarium) ; Swan Lake 26.VI.1938, *E. West* F. 17211 (Typus of *M. westii*) ; Trinidad : Naranja about 1800 ft., 2.X.1949, *Dennis* 114.

I have personally examined only my own and the Ravenel material at Kew. Dr. Singer, however, has seen all the collections cited and agrees they represent a single species. It is interesting to note that Berkeley described this brown pileus as " dark blood red " and stated it to be the same colour as his *M. atrorubens*. This confirms my suspicion that *M. atrorubens* was also in fact a brown species and supplies an earlier name for *M. castaneus* Mont. (Dennis 1951a).

Panus Fr., Epicrisis systematis mycologici 396 (1838).

Panellus Karst. Bidr. Finl. Nat. Folk. **32,** XIV (1879).

Type species : *Agaricus stipticus* Bull. ex Fr.

Donk (1949) has clearly explained why it is necessary to accept *Ag. stipticus* as the type of *Panus* in place of *Ag. conchatus* Bull. ex Fr. as advocated

by Singer and Smith (1946). *Panellus* Karst. then becomes an obligate synonym of *Panus* Fr. The large imbricate fungi with non-amyloid spores commonly referred to *Panus* are here relegated to the comprehensive form-genus *Pleurotus*.

Panus luteus Dennis, spec. nov.

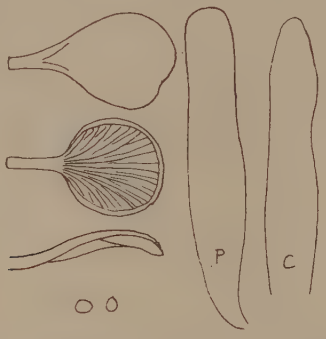


Fig. 18. *Panus luteus*. Dennis 381. Sporophores natural size. Pleuro- (P), cheilocystidia and spores × 660.

Pileus 3 cm. latus, regularis vel spathulatus, umbilicatus, glaber, nitidus, striatus, primulinus ; caro tenuis, lutea ; lamellae confertae, decurrentes, pileo concolores ; stipes excentricus vel lateralis, apice incrassatus, glaber, solidus, luteus ; sporae subglobosae, 2·5–3·5 × 2–2·75μ, amyloideae ; cheilo- et pleurocystidiae cylindricae vel subventricosae, 55–70 × 10–12μ, hyalinae. Ad truncos putridos, Naranja, Trinidad, *Dennis* 381, Typus. Fig. 18.

Trogia belangeri (Mont.) Fr., Epicrisis 402 (1838).

Agaricus belangeri Mont. in Belanger Voy. Indes Or. Bot. **2,** 145.

Pleurotus belangeri (Mont.) Dennis in Indian Phytopath. 4, p. 121, 1952.

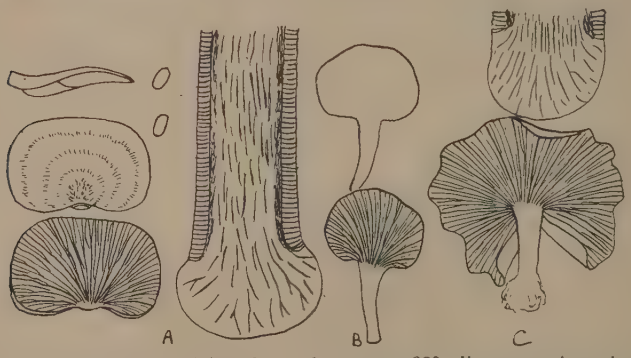


Fig. 19. A. Sporophore, radial section, × 1, spores × 660, diagrammatic section of gill edge × c. 160 in J49. B. Sporophore of *Panus bicolor* Mont. in Herb. Paris × 1. C. Sporophore × 1 and diagrammatic section of gill edge in the type of *P. sprucei* Berk., probably a synonym of *P. bicolor*.

A single collection, *Dennis* J49, bears a close resemblance to this oriental species as described and figured by the writer in a paper on Indian fungi referred to *Trogia* Fr. Dennis 1952. Spores have not been

recovered from the Indian material but J49, on sticks, High Peak, Blue Mountains, Jamaica, yielded a white spore print, spores elliptical, 4–5 × 2·5–3 μ, strongly blue-amyloid. In this it agrees with the species of *Panus* sensu Donk, *Panellus* sensu Singer. *Panus bicolor* Mont. and *P. sprucei* Berk., both from tropical South America, have similarly gelatinised tramal hyphae and swollen gelatinous gill edge but have a distinct lateral stipe. (Fig. 19). Dennis (1952), taking *Pleurotus* in the comprehensive sense of Pilat, described J49 under the name *Pleurotus belangeri* var. *occidentalis*.

Schizophyllum *Fr.* Syst. Myc. **1,** 330 (1821).

Type species : *S. commune* Fr.

The tropical American species of *Schizophyllum* have been fully described by Linder (1933) who recorded *S. fasciatum* Pat. from Trinidad and *S. radiatum* (Swartz) Fr. with *S. brevilamellatum* Linder from Venezuela. There is West Indian material at Kew of the following :—

Schizophyllum radiatum (*Swartz*) *Fr.* in Nov. Acta. Soc. Sci. Upsal. ser. **3,** 1, 41 (1855).

This is the tropical representative of *S. commune* Fr., common throughout the Americas from Georgia and California to Bolivia and Rio Grande do Sul.

Trinidad collection : La Seiva Valley, *E. M. Wakefield* 209, 16. 1. 1921.

Schizophyllum umbrinum *Berk.* in Hooker's Journ. Bot. **3,** 15 (1851).

Collections seen :—Venezuela : Rio Chacaito, Caracas, 18.XI.1949, *Dennis* 480 ; Brazil : Caripi, Para, *Spruce* 1849 (Typus) ; Cuba, *Wright* 64 ; Nicaragua, *C. Wright,* unnumbered in Herb. Berk.

Literature cited

Dennis, R. W. G. 1950. Kew Bull., pp. 321–333.

Dennis, R. W. G. 1951a. Kew Bull., pp. 153–163, 196–210.

Dennis, R. W. G. 1951b. Trans, Brit. mycol. Soc. 34 pp. 411–482.

Dennis, R. W. G. 1952. Indian Phytopathology 4, pp. 119–122.

Donk, M. A. 1949. Bull. Bot. Gard. Buitenzorg, ser. 3, 18, pp. 271–402.

Linder, D. H. 1933. Amer. Journ. Bot. 20, pp. 552–564.

Pilat, A. 1935 in Kavina-Pilat, Atlas des Champignons de l'Europe 2, Pleurotus Fr.

Singer, R., & Smith, A. H. 1946. Mycologia 37.

Jute Substitute Fibres.*—The partition of India and the abdication of British political influence in that sub-continent have given rise to repercussions in many fields. Not least in importance is the field of fibre production. India has long held a monopoly in the production of Jute and similar fibres, a fact which has caused growing concern in other countries. Jute fibre is a raw material of strategic importance and it is obviously desirable that adequate alternative supplies of suitable fibres should be assured. Jute substitute fibres are not a recent innovation. The fibres from the three plants upon which attention is concentrated in this book, namely *Hibiscus cannabinus* L., *H. sabdariffa* L., and *Urena lobata* L., have been grown and used in certain tropical countries for many years. The fibre of *H. cannabinus*, variously known as Bimlipatam jute, Deccan hemp, Kenaf, etc., has been exported from India in considerable quantities. *H. sabdariffa*, particularly the var. *altissima*, is almost equally well known as the source of Roselle fibre. Urena fibre, which the author prefers to call Aramina fibre, is not so well known in commerce but is practically cosmopolitan in tropical and sub-tropical regions, where it is frequently used locally. These species, which are probably the most promising " jute substitutes ", have already been grown on a large scale in Florida, Cuba, Brazil, the Belgian Congo, South Africa and elsewhere. The areas where true jute (*Corchorus*) can be grown are limited by climatic, edaphic and sociological conditions. The jute substitutes, which are not so exacting in their requirements and are more cosmopolitan, produce fibres which can be at least equal in quality to the medium and coarser grades of jute and might be considerably improved.

Much experimental work has been done in recent years, but the results are inevitably dispersed in various publications. In compiling this book Mr. Haarer has done a service to those who are interested in these economic plant fibres, but whose library resources are limited. He has extracted information from a large number of sources, as is testified by the bibliography of 156 titles, to which he has added his own comments and opinion. He brings together the various outlooks of the botanist, the agriculturalist, the engineer and the men of commerce. The importance of plant-breeding and selection is stressed no less than the necessity for organization and mechanization in the different stages of fibre production. The botanical description, history, distribution, local uses, etc., are given for each species. Their individual climatic and cultural requirements are dealt with at length, and the advantages of mechanization in seed sowing, harvesting and fibre extraction are considered in some detail. Many of the plates in the book illustrate this modernization and mechanization of the industry. Tables and information in the text giving the comparative yields of jute and its substitutes should be useful to prospective growers.

This book is, of necessity, for the most part a compilation. It should prove of special value to the practical man and to all those concerned with the production of any of the jute substitute fibres.

S. G. Harrison.

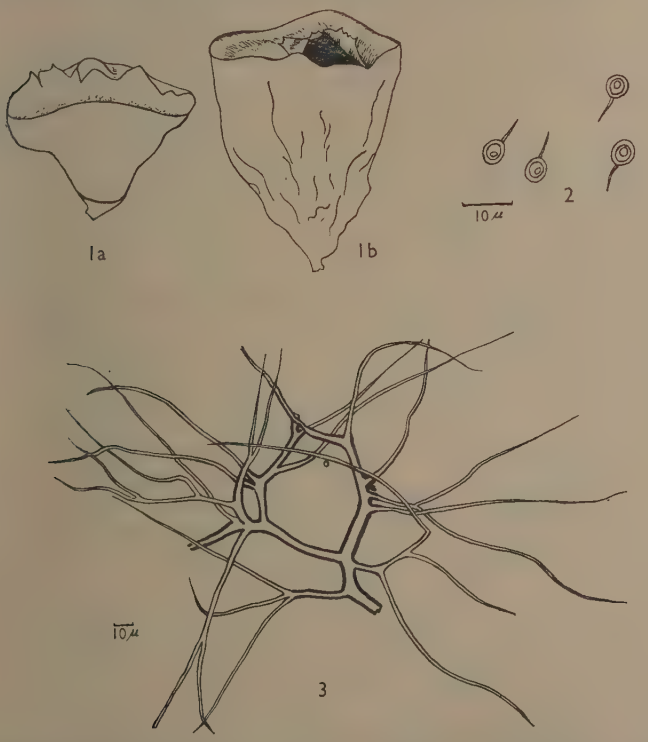
*Jute Substitute Fibres. A. E. Haarer. Wheatland Journals Ltd., London, N.W.6. Pp. XXI, 185, 57 plates. Price 30s.

BOVISTELLA RADICATA (MONT.) PAT.

A Gasteromycete new to Britain.

D. A. Reid.

In early June, (1952) Mr. Walters of the Imperial Mycological Institute collected several very old fruit bodies of a Gasteromycete, which closely resembled an ordinary Lycoperdon species, owing to the presence of a very well developed sterile base. However, examination of the capillitium, showed it to consist of very much branched ' dendroid ' hyphae, so characteristic of the genus Bovista. The combination of these two characters—i.e. the sterile base and branched capillitium indicated that the specimens were a species of Bovistella. Subsequently they were identified as *Bovistella radicata* (Mont.) Pat.



Bovistella radicata (Mont.) Pat. Fig. 1 (a) Vertical section through sporophore showing sterile cellular base and rooting portion. (b) The complete sporophore. (Both × ½). Fig. 2. Pedicellate Spores. Fig. 3. Portion of the richly branched Capillitium.

The specimens were collected from a sandy grass verge in Richmond Park near White Lodge. The new seasons rapidly growing vegetation had evidently uprooted the sporophores, and left them lying loose amongst the grass. They are very strongly turbinate, being abruptly narrowed to a pointed base. The actual rooting portion is absent, however there is the suggestion of such a structure in two examples. There is some variation in size of the three specimens, but the largest is 7 ×

5 cms., and in all the specimens the endoperidium covering the gleba, has collapsed, so that the height when fresh was appreciably greater.

The exoperidium has mostly disappeared, but in one specimen, it is visible as a very thin chocolate brown layer, covered in parts, by very minute pointed, rather tomentose warts. The endoperidium is very thin and papery, and of a pale grey-brown colouration. Both these layers have a decidedly waxy lustre.

When cut in half, the well developed, sterile, cellular base is seen to occupy at least half the height of the sporophore. It is greyish-brown toward the base, becoming darker and richer brown nearer the gleba. There is no distinct diaphragm separating the gleba from the sterile base. The gleba itself has practically disappeared, but the remnants are a deep ochre-brown.

The capillitium, as already stated, consists of much branched, intertwined ' dendroid ' hyphae. These have a main trunk up to 7·5μ in diameter, with thickened walls up to 1·5μ, which gives rise to numerous slender tapering branches. The main trunk is golden-brown, but the ultimate portions of the branches are almost hyaline. The spores are globose, to subglobose 4·5–5 × 3·5 ·5μ, and have pedicels up to 8μ long.

The discovery of this fungus in Britain is rather remarkable, as it has a predominantly southernly range. There appear to have been very few collections in Europe and Lloyd (1906) writes " Originally collected in Algeria by Durieu, it was called *Lycopodon radicatum* by Montagne, but recently it was collected in Tunis by Patouillard and the name changed to Bovistella radicata. In Europe it is a very rare plant and only two collections are known both made during the past season (1905). First by Rev. P. Merino, Galicia, Spain, and second by Prof. Plottner, Rathenow, Germany."

However Lloyd (1902) writing of *Bovistella ammophila* Lév. quotes Patouillard " We have also in France two other species "

" 1st *Bovistella radicata* Mont., (=*Bovistella ohiensis* Morg.).
" 2nd *Bovistella paludosa* (Lév.) = (*Lycoperdon paludosa* Lév. etc.)"

Coker and Couch (1928) regard the American species *Bovistella ohiensis* (Ell.) Morg. as synonymous with *B. radicata* and Lloyd (1906) writes thus, under *B. ohiensis* " *Bovistella radicata*—The European form of this plant, is hardly worthy of a separate name. It is a more rigid plant, and has stiffer cortex spines and not so strong pedicels to the spores, which is all the difference I can note ". He also gives for the distribution of the American plant, the following account "—— very common species in United States and of a southern range. It occurs from Washington, D.C. west to Missouri, and all over the Southern States. It is not found in the extreme East, North or West."

Owing to the poor condition of the specimens from Richmond Park, it is hoped to collect some fresh material in various stages of growth, from the same locality during the present season.

References :—

Coker and Couch. The Gasteromycetes of the Eastern United States and Canada, 1928, p. 95.

Lloyd, 1902. Mycological Notes, Vol. I, 1898–1905. P. 88.

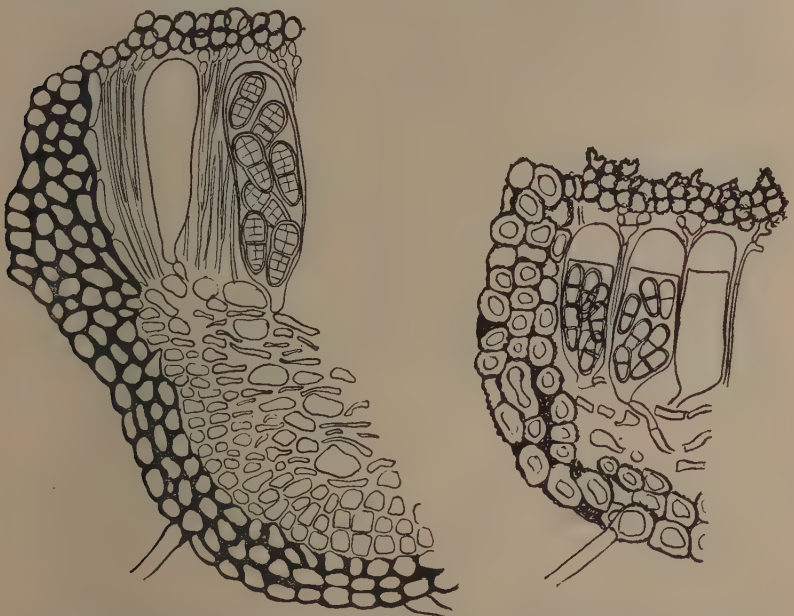
Lloyd, 1906. Mycological Notes, Vol. II, 1905–1908. P. 279–280.

NEW SPECIES OF DICTYONIA AND COCCOMYCES.

R. W. G. Dennis.

Dictyonia lophirae *Dennis*, spec. nov. Ascomatibus hypophyllis, superficialibus, sparsis, sessilibus, subgelatinosis, rotundato-discoideis, atris, levibus, disco plano, ca. 500μ diam. ; ascis clavatis, substipitatis, crasse tunicatis, 30–40 × 10–14μ, 8-sporis, apice rotundato-obtusis, 10μ crassis ; paraphysibus filiformibus copiosis obvallatis, epithecio olivaceo conglutinatibus ; ascosporis conglobatis vel subdistichis, ovoideis, media 1-septatis constrictis, hyalinis, 11–12 × 4μ.

Hab. in foliis Lophirae alatae, Fintonia, Sierra Leone, 2.2.1950, F. C. Deighton M 3584B (Typus).



Left : *Dictyonia pouroumae* (P. Henn.) Syd. Section of marginal portion of young apothecium × 660, from Ule, *Mycothea brasiliensis* 87, issued as *Rehmiomyces pouroumae* P. Henn. Right : *Dictyonia lophirae* Dennis spec. nov. Section of marginal portion of apothecium from Deighton M 3584B.

The type species of *Dictyonia*, *D. pouroumae* (P. Henn.) Syd. has ascospores at first 1-septate with rather thick hyaline walls like those of Deighton's fungus but at maturity the loculi are subdivided by numerous thin septa so that the spores become muriform. In structure and habit, seated on a network of superficial brown hyphae on the under surface of a leaf, it closely resembles *D. lophirae* and as spore septation is a character of doubtful value in distinguishing discomycetous genera I am unwilling to propose a new monotypic genus for the latter. *Bulgariastrum* Syd. has 1-septate ascospores but its apothecia are erumpent in clusters associated with an excipulaceous conidial state, a habit very different from that of the two species of *Dictyonia*. *D. lophirae* has a thin flesh of hyaline hyphae

embedded in a colourless matrix. Towards the surface of the receptacle the cells become inflated and more or less isodiametric, with very thick glassy walls coated by a thin layer of brown amorphous matter, thus forming a dark brown pseudoparenchymatous excipulum. The epithecium arises by a similar development in the terminal branches of the paraphyses and gives a minutely pruinose appearance to the disc when viewed dry under a magnification of about × 20. In *D. pouroumae* young apothecia have an almost identical structure but at maturity gelatinisation of the flesh is much further advanced so that it consists of very slender, loosely woven, hyaline hyphae permeating a colourless mucilaginous matrix. The resultant expansion makes the brown excipular layer very thin and may completely disrupt the epithecium. In both species the mucilaginous matrix remains unstained in Melzer's reagent.

Dictyonia should probably be referred to the Lecanorales rather than to the Helotiales and invites comparison with the genera of epiphyllous lichens.

Coccomyces cocoes *Dennis*, spec. nov.

Maculis pallidis, indeterminatis ; ascomatibus sparsis immersis, atris, primitus clausis, dein epidermidem elevantibus et tandem in lacinias 4–5 stellatim disrumpentibus, 1 mm. diam, orbicularibus, disco plano, flavido ; ascis cylindraceis, apice rotundatis, 130 × 7μ, sporidiis filiformibus, hyalinis 70–90 × 1μ ; paraphysibus numerosis, filiformibus, simplicis, apice tenuiter incrassatis 5μ crassis.

Hab. in foliis dejectis Cocoes nuciferae, Asanta, Gold Coast, 14.5.1949, S. J. Hughes 687 (Typus).

A new colour variety in Anagallis arvensis L.

Anagallis arvensis L. subsp. *arvensis* var. *vinacea* Marsden-Jones var. nov., a planta typica petalis vinaceis distinguitur. Type in Herb. Kew. Petals ; upper surface *Deep Purplish Vinaceous*, lower surface *Purplish Vinaceous*. Colour matched with Ridgway's Color Standards (Plates 39 and 44). The type specimen is from a garden culture. The original plant was found in a garden in Sark in 1936, one plant only growing with scarlet-flowered plants. This colour variety was found again by C. M. L. La Lacheur at Shoreham, Sussex, in July 1947. Seed communicated by him to Kew is being grown in the Herbarium Experimental Ground under No. K. 2611. In 1951 six plants of the above colour variety growing with scarlet-flowered plants were also found by Mrs. Timperley in an arable field below Apshill Copse, Wootton Rivers, Wiltshire.

E. M. Marsden-Jones.

NOTES ON AFRICAN ASCLEPIADACEAE. II.*

A. A. Bullock.

I have found it desirable to resuscitate the genus *Stathmostelma* K. Schum. (1893), which was reduced to *Asclepias* L. by Brown in the *Flora of Tropical Africa* (1902) but retained by Schlechter who as late as 1913 defended his opinion and described a new species (*S. frommii*). De Wildeman (1904–6) also described two species but expressed no very decided opinion ; in each case he provided (invalid) alternative names, using the same epithet for both species !

Attention is drawn to a certain confusion which has arisen owing to Brown's (1902) misidentification of *Stathmostelma gigantiflorum* K. Schum. His error was noted (MS in Herb. Kew.) by Miss E. A. Bruce when she had an opportunity, before the 1939–45 war, to examine the holotype which was preserved in the Berlin Herbarium. A specimen from the *locus classicus*, which I have treated as the neotype, is recorded on page 52. This has led me to distinguish no fewer than four new species—one from Uganda, one from Kenya and northern Tanganyika and two from the Red Locust plains of the Rukwa Valley, south-western Tanganyika. Two of these are described below, the others will be published when figures have been prepared. New specimens of the rare *Raphionacme splendens* Schltr. collected by the writer in the miombe woodland bordering the valley of the Moyowosi river in north-western Tanganyika are recorded on page 60 ; collectors are particularly asked to look out for this very beautiful plant and to obtain seed and leaf specimens. If dug up whilst in flower the plant should survive transplanting, and living specimens would make a very welcome addition to the Kew collections. A new collection of the rare *Baseonema gregorii* Schltr. et Rendle, hitherto unrepresented at Kew, is also recorded p. 64.

As mentioned in the first part of this series, the writer is convinced that the fruits and underground parts of asclepiadaceous plants are of very great importance for the accurate delimitation of genera as well as of taxa of sectional or subgeneric status. Collectors are asked to bear this in mind and to include roots and fruits in their specimens. A word of warning may be not out of place ; different species, of similar general facies but with different ecological preferences, flower at slightly different times with the result that fruiting specimens of one may be confused with flowering specimens of another.

On page 59, under species of *Ceropegia*, I have drawn attention to the possibility of floral polymorphism ; if this really exists, it is almost certain to provide a rather complicated mechanism for ensuring cross pollination. Field observation is required for the solution of such a problem, possibly allied with controlled culture experiments, which could be best carried out in Africa.

The function of the corona and its relationship to pollination is but little understood, and though it is unlikely to be the same in all taxa, field studies will undoubtedly lead to interesting results which may well yield evidence bearing on the phylogeny of the family.

*Continued from Kew Bulletin, **1952**, 426 (1952).

Stathmostelma gigantiflorum *K. Schum.* in Engl. Bot. Jahrb. **17,** 129, t. 6 A-C (1893), et *l.c.* 132, in clavi, et in Engl. Pflanzenw. Ost-Afr. **C,** 322 (1895), et in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 240, f. 70 A C (1895), lectotypus nominis generici ; Schltr. in Journ. Bot. **33,** 333 (1895).

Asclepias gigantiflora (K. Schum.) N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 326 (1902), quoad syn. sed excl. spec. Scott Elliot. 6283 cit.

In his key to the six species which he originally referred to *Stathmostelma*, Schumann (1895) placed *S. gigantiflorum* and *S. angustatum* (Hochst.) K. Schum. in section *Eustathmostelma*, the other four, including *S. incarnatum* K. Schum., he placed in section *Pseudasclepias*. In the *Pflanzenfamilien*, he assigned only five species to the genus ; *S. incarnatum* was transferred to *Eustathostelma* whilst *S. angustatum* was omitted. In both works there are diagnostic figures of *S. gigantiflorum* and I therefore nominate this species as lectotype of the generic name.

The genus was reduced by N. E. Brown (1902) to *Asclepias*, but Schlechter (in Engl. Bot. Jahrb. **51,** 138–139 : 1913), having always previously maintained it, defended its retention. Following my own policy of dividing large genera which are clearly heterogeneous on account of too much reliance having been placed on single morphological features, I propose to retain *Stathmostelma* very much as defined by K. Schumann. It seems likely that some of the species described since 1895 will have to be reduced, but I have not yet seen the types of the species from the southern Belgian Congo, whilst the types of the East African species described by K. Schumann and R. Schlechter no longer exist.

S. gigantiflorum K. Schum. is apparently a very rare plant which has been collected only twice. The type, formerly at Berlin, was collected by *Böhm* (No. 24) at Kakoma*, south of Tabora in March 1881 ; I have not found any evidence indicating that this collection was distributed to other herbaria and it must be regarded as lost. There is, however, a photograph of the Berlin specimen at Kew and it was examined by Miss E. A. Bruce sometime before 1939. The second collection was made by *Mr. H. M. Lloyd* (No. 42) at the same locality in January 1936 and bears Miss Bruce's note, " This specimen has been compared with the type of *A(sclepias). gigantiflora* (K. Schum.) N. E. Br. and agrees in all respects." Mr. Lloyd notes that it is a plant of the miombo (i.e. *Brachystegia-Isoberlinia* woodland) " 18-24 ins. with mauve flowers ". Böhm's label gives a similar habitat but indicates that the plant occurs in open grassy glades.

N. E. Brown (1902) was at fault in referring *Scott Elliot* 6283 to this species ; the error was pointed out by De Wildeman (Ann. Mus. Congo, Bot. Sér. 5, **1,** 189 : 1904, in adnot. sub *Stathmostelma verdickii*) in a tentative manner and it was finally established (though not published) by Miss Bruce when she examined the type. The Scott Elliot specimen represents an undescribed species and will be included in the next paper in this series, when I hope also to deal with the Belgian Congo species described by De Wildeman and Dewèvre.

*In his citation, Schumann gives " Rekoma " as the locality ; there is no doubt, however, that this is an error for either Kekoma or Kakoma.

Stathmostelma thomasii *Bullock* sp. nov., a *S. gigantifloro* K. Schum. affinis sed floribus multo minoribus, foliis minoribus angustius linearibus, caulibus humilioribus basi ramosis differt.

Herba perennis, caulibus basi ramosis circiter 15 cm. altis e radice tuberosa ortis superne habitu sympodiali floriferis glabrescentibus. *Folia* elongata, linearia, usque 14 cm. longa (? vel ultra) et vix 4 mm. lata utrinque glabra vel subtus pilis paucis praedita, marginibus (saltem sicco) plus minusve recurvis, apice acuta, basin versus in petiolum obsoletum acute angustata. *Cymae* umbelliformes, 1–4 florae, terminales sed interdum velut axillares, pedunculis 2–3 cm. longis plus minusve pubescentibus, pedicellis circiter 2 (rarius usque 3) cm. longis plus minusve (superne densius) pubescentibus ; bracteae lineari-filiformes, 5–10 mm. longae, pubescentes. *Flores* sordide virides. *Calyx* fere ad basin 5-partitus, extra pubescens, lobis lanceolatis 6 mm. longis acutis sub anthesin patentibus. *Corolla* rotata ; tubus vix 2 mm. longus ; lobi oblongi vel lanceolato-oblongi, 12–14 mm. longi, 5 mm. lati, apice subacuti, marginibus recurvis flexuosis extra intusque glabri sed intus minutissime papillati. *Coronae lobi* 5, longitudinaliter plicati, carnosi, forte carinati, basin versus extra carinis 2 parvis lateralibus praediti, intus densissime papillato-puberuli, 10 mm. longi, lobis lateralibus anguste triangularibus circa gynostegium patentibus, lobo terminale triangulare acuto corniforme patente stigma superante. *Caudiculi* spathulato-falciformes, margine flexuosa, 3 mm. longi, superne lineares, basin versus 1 mm. lati. *Gynostegium* vix 5 mm. altum. *Folliculi* angustissime fusiformes, 16 cm. longi dimidio inferiore steriles, velut stipitati. *Semina* comosa, elliptica, haud rugosa, 4 mm. longa et usque 2·5 mm. lata :

Uganda. Kokumongola, Karamojo, in grassland, 4000 ft. ; " branching herb from swollen root, sepals green, petals white, flecked purple " ; 28 May 1939, *A. S. Thomas* 2876 (*Typus specei*). Napak, Karamoja, in grassland, 4000 ft. ; " occasional herb from edible root 5 ins. long and 1 ins. thick, flowers dull green " ; 27 May, 1940 (fl. fr.), *A. S. Thomas* 3550.

Stathmostelma nomadacridum *Bullock*, sp. nov. a *S. gigantifloro* K. Schum. affinis sed floribus albidis vel pallide viridibus plus minusve roseo-maculatis omnibus partibus minoribus, sepalis anguste lanceolatis extra dense pubescentibus, corollae lobis extra dense puberulis, coronae lobis apice minus carnosis acute et anguste triangularibus erectis gynostegium duplo superantibus facile distinguitur.

Herba geophytica, laticifera, perennis ; *caules* pauce ramosi e radice tuberosa subglobosa circiter 8 cm. (? vel ultra) diametro orti, 3–6 dm. alti, internodiis 3–6 cm. longis alternatim longitudinaliter bicanaliculatis, in canaliculis leviter pubescentes, ceteris glabrescentes vel glabri. *Folia* sessilia vel obsolete petiolata, graminiformia, erecta vel ascendentia, usque 20 cm. longa et 1 cm. lata, utrinque plus minusve pubescentia, apice acuta, basin versus angustata, marginibus (saltem sicco) recurvis, superiora flores superantia. *Cymae* terminales vel habitu axis sympodiali velut ex axillis foliorum superiorum ortae, 3–5-florae, pedunculis circiter 3 cm. longis leviter vel superne densius pubescentibus, pedicellis

pubescentibus 3–5 cm. longis ; bracteolae caducae, lineares, circiter 1 cm. longae, satis dense strigoso-pilosae. *Calyx* fere ad basin 5-partitus, lobis lineari-lanceolatis 7–9 mm. longis basi 1 1·5 mm. latis acutis extra dense pubescentibus. *Corolla* rotata, tubo vix 1 mm. longo ; lobi lanceolato-oblongi, circiter 2 cm. longi et 7 mm. lati, apice acuti, extra pilis brevis erectis dense puberuli, intus minus dense papillato-puberuli. *Coronae lobi* vix carnosi, plicati, fere 1·5 cm. longi, dimidio quoque semi-elliptico 4·5 mm. lato, intus dense papillati et basin versus bisaccati, utrinque basin versus dente triangulare marginale et superne cornubus patentibus subulatis papillatis fere 3·5 mm. longis praediti, apice plicato-ovati leviter acuminati declinato-ascendentes. *Gynostegium* robustum, 8 mm. altum. *Caudiculi* falcato-obovati, marginibus exterioribus flexuosis basin versus recurvis, 3 mm. longi, fere 1·5 mm. lati, horizontaliter striati. *Folliculi* erecti, anguste fusiformes, 10 cm. longi. *Semina* comosa, elliptica, 4 mm. longa et fere 2 mm. lata, utrinque rugosa.

Tanganyika Territory. Milepa, Rukwa Valley ; " white-flowered geophytic perennial 1–2 ft. high with a single 3 inch [diam.] rounded tuber which is edible when the thin latex-bearing outer layer is removed ; flowers in the middle of the rains ; dotted commonly in *Hyparrhenia rufa* fringes of the flood plain "; 7 Jan. 1938 (fl., fr.), *Michelmore* 1438 (*typus specei*). Milepa, Rukwa valley, 3000 ft. ; " in open grassy plain seasonally flooded [but] no floods at time [of collection] and grass short ; a fleshy herb with much milky sap, flowers pale green and dirty pink " ; 24 Dec. 1946, *Pielou* 45. Bulambya ; Feb. 1914 (fl.) *Stolz* K. 48.

Mr. A. P. G. Michelmore and Dr. D. P. Pielou severally collected this plant whilst investigating the ecology of the Red Locust [*Nomadacris septemfasciata* (Serv.)] in its Rukwa valley outbreak centre. Although I visited the same locality in 1950 and in 1951 I did not see the plant ; the vegetation of the area is in a state of flux owing to the ever-changing level of the northern portion of the salt Lake Rukwa.

Stathmostelma angustatum *K. Schum.* in Engl. Bot. Jahrb. **17,** 132 (1893), in clavi.

Gomphocarpus angustatus Hochst. in Pl. Schimp. Abyss. No. 1589, nomen.

Asclepias angustata N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 343 (1902), descr. angl.

Schumann (1893) placed this species, based on Schimper 1589 from Abyssinia, near to *S. gigantiflorum*, but the Kew specimen (which is a poor one) does not suggest any close affinitiy with the type of the generic name. I have not been able to identify it with any other material at Kew but it is certainly very near to *S. pedunculatum* (Decne.) K. Schum.

Stathmostelma bicolor *K. Schum.* in Engl. Bot. Jahrb. **28,** 457 (1900).

Asclepias muhindensis N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 344 (1902), non *Asclepias bicolor* Moench (1794).

This species, collected by *Goetze* (No. 523) in the Uhehe district of southern Tanganyika (January 1899, in the Muhinde grassland) is known to me from the description only.

It is said to resemble *S. angustatum* K. Schum., a plant known only from

the Abyssinian type collection (*Schimper* 1589), from which it is said to differ in having narrower sepals. Although this character is insufficient for specific differentiation, I cannot, in view of the paucity of material and wide geographical separation of the two localities, unite the two species.

Stathmostelma fornicatum (*N. E. Br.*) *Bullock*, comb. nov.

Asclepias fornicata N. E. Br. in Kew Bull. **1906,** 250 (1906).

Only the type of this species, *McClounie* 81, collected on the Nyika Plateau at 8,000 ft. in February–March, 1903, has been recorded hitherto. The following is an additional record :—

Northern Rhodesia. Ridgeway Road, Mazabuka, 3300 ft.; "herb 9-12 in. with yellow flowers, common;" 20 Dec. 1931, *C. G. Trapnell* 558.

Stathmostelma propinquum (*N. E. Br.*) *Schltr.* in Engl. Bot. Jahrb. **51,** 134 (1913).

Asclepias propinqua N. E. Br. in Kew Bull. **1895,** 254 (1895), et in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 343 (1902).

This species was transferred to *Stathmostelma* by Schlechter following his defence of the retention of the genus in 1913. It is represented at Kew by the rather poor type specimen collected on Kilimanjaro by *Smith* (s.n.) in April 1893, and by *Haarer* 868 collected near Kamuri in the Upare District in October 1927.

Stathmostelma nuttii (*N. E. Br.*) *Bullock*, comb. nov.

Asclepias nuttii N. E. Br. in Kew Bull. **1898,** 308 (1898), et in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 339 (1902).

Only the rather poor, immature, type specimen of this species is known ; it was collected by *W. H. Nutt* in 1896, between lakes Tanganyika and Rukwa, at 6,000 ft.—presumably on the Ufipa Plateau.

Stathmostelma incarnatum *K. Schum.* in Engl. Bot. Jahrb. **17,** 130 (1893) et in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 240 (1895) ; Durand et Schinz, Études Fl. Congo, 193 (1896) ; Hiern in Cat. Afr. Pl. Welw. **1,** 686 (1898) ; Durand, Syll. Fl. Congol. 361 (1909) ; non *Asclepias incarnata* Linn. (1753), nec Walt. (1788).

Asclepias coccinea N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 340 (1902).

The specimens seen and cited by Schumann were probably all destroyed during the late war ; of the collections cited, *Pogge* 381 and *Welwitsch* 4176 are represented at Kew and I propose to treat the *Welwitsch* specimen at Kew as the neotype of the species. This specimen was used by Brown (1902) in drawing up his description and consists of three flowering stems, one attached to a portion of the rootstock. Brown dissected flowers from two of the three umbels and found that the coronal lobes had a central tooth in one and no sign of an appendage in the other. This tends to destroy Schumann's division of the genus into two sections, which depended on the presence (§*Pseudasclepias*) or absence (§*Eustathmostelma*) of the central tooth.

Stathmostelma frommii *Schltr.* in Engl. Bot. Jahrb. **51,** 139 (1913).

I am not aware that there is any record of this species other than that given by Schlechter under his original description. The type was collected by *Fromm* under two numbers, 89 and 195, and both specimens presumably were destroyed during the late war. The *locus classicus* is " bei Urungu und Msamoia ".

The following specimen I have identified from the description :—

Northern Rhodesia. Sunsu, Abercorn District, 5200 ft., at the bases of extinct termite mounds near the foot of the mountain ; erect to 3 ft., one to several [simple] stems from a large tuberous rootstock, flowers orange ; 6 Jan. 1950, *Bullock* 2185.

The plant is locally abundant in the region of Sunsu mountain and is frequent throughout the Saisi valley and in similar situations on the Ufipa plateau. It is surprising that such a striking and brilliantly coloured plant has not been collected more frequently.

Stathmostelma spectabile (*N. E. Br.*) *Schltr.* in Engl. Bot. Jahrb. **51,** 138 (1913).

Asclepias spectabilis N. E. Br. in Kew Bull. **1895,** 254 (1895), et in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 325 (1902).

Stathmostelma pachycladum K. Schum. in Engl. Bot. Jahrb. **28,** 458 (1900).

Asclepias pachyclada (K. Schum.) N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 325 (1902).

Stathmostelma macropetalum Schltr. et K. Schum. in Engl. Bot. Jahrb. **33,** 325 (1903).

Asclepias macropetala (Schltr. et K. Schum.) N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 616 (1904).

The new synonymy proposed above depends on my identification, *ex descriptione*, of various specimens also identified with the type of *S. spectabile* by direct comparison.

N. E. Brown (1902, 1904) did not see material of either *S. pachycladum* or *S. macropetalum* and his descriptions of both were taken from the originals. Although the measurements given by him show some variation, as shown below, the most significant one (marked by an *, see footnote) proves to be an error. The material at Kew falls well within the range of variability indicated by the figures :—

	Leaves (Ins.)	Pedicels (ins.)	Sepals (lines)	Corolla lobes (lines)	Corona lobes (lines)	Staminal column (lines)
S. spectabile	3½–7 × 1–2	¾–1½	4–6	8	4*	3
S. pachycladum	3½–8½ × 1½–4⅓	1–1½	2–2½	8½	—	2
S. macropetalum	2⅜–5½ × 1–1¾	2	4–4½	8	7	3½

*I have remeasured the coronal lobes of the type specimen and find them to be between 6 and 8 lines long. Probably Brown used, on this occasion, a scale graduated in 1/8ths of an inch instead of 1/12ths.

Stathmostelma odoratum *K. Schum.* in Engl. Bot. Jahrb. **28,** 457 (1900).

Asclepias odorata (K. Schum.) N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 324 (1902).

This is another species of the *Goetze* collection (Jan. 1899, No. 498) from Sula, Uhehe, which I have been unable to identify with any more recent material at Kew or the British Museum. It appears to be one of the broad-leaved species allied to *S. frommii* Schltr. and *S. spectabile* (N. E. Br.) Schltr. From the latter it is readily distinguished by its crested internal coronal appendage and orange colour ; from the former by its very much smaller flowers, all the parts of which differ in size (relative and absolute) and shape.

Stathmostelma pauciflorum (*Klotzsch*) *K. Schum.* in Engl. Bot. Jahrb. **17,** 132 (1893), et in Engl. Pflanzenw. Ost Afr. **C,** 322 (1895), et in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 240 (1895) ; Schltr. in Journ. Bot. **33,** 333 (1895).

Gomphocarpus pauciflorus Klotzsch in Peters, Reise Mossamb. Bot. 276 (1861) ; non Hochst. et Steud. ex Steud. Nom. Bot. ed. 2, **1,** 698 (1840), nomen.

Stathmostelma reflexum Britt. et Rendle in Trans. Linn. Soc. Ser. 2, Bot. **4,** 27, t. 6, ff. 4–6 (1894).

Asclepias reflexa (Britt. et Rendle) [*l.c.* 28, in adnot., nom. provis.] N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 344 (1902).

Asclepias pauciflora (Klotzsch) E. A. Bruce in Kew Bull. **1940,** 55 (1940).

Miss Bruce (1940) pointed out that the correct epithet for this species is derived from *Gomphocarpus pauciflorus* ; the use of the epithet *reflexa* by Brown was based on the old " Kew " rule by which the earliest epithet under the " correct " genus was accepted.

The plant is represented at Kew by a large number of specimens from Kenya, Tanganyika, Northern and Southern Rhodesia, Nyasaland and Portuguese East Africa, and one (*Kassner* 2417) from the Luende River, Belgian Congo. The fruit is known from two localities—" Zambesi delta " (*Kirk* 16) on which Brown's description was based, and Mombasa. The latter was collected by the late Lady Muriel Jex-Blake (for *Miss E. R. Napier* 2268) and shows paired, almost ripe follicles which form an erect V. The single follicles on Kirk's specimen are old ones, already dehisced and without seeds.

Margaretta distincta *N. E. Br.* in Kew Bull. **1895,** 255 (1895).

Schizoglossum distinctum (N. E. Br.) N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 371 (1902).

S. scyphostigma K. Schum. in Engl. Bot. Jahrb. **30,** 384 (1901) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 372 (1902).

S. chirindense S. Moore in Journ. Bot. **46,** 295 (1908).

The very poor material seen by N. E. Brown (1895, 1902) led him to become doubtful of his original assignment of this species to *Margaretta*

and he transferred it to *Schizoglossum* on account of its supposed affinity with other species which he placed in that genus. The better material now available leads me to restore the species to *Margaretta* and on the evidence of the description and a single flower and leaf from the type, to unite K. Schumann's *Schizoglossum scyphostigma* with it. Of Spencer Moore's *S. chirindense* there is an isotype at Kew.

The geographical range now includes Nyasaland and southern Tanganyika, the additional Kew material being from the Kyimbila district (*Stolz* 2356—two excellent sheets !) and from the Elton Plateau (*Davies* E 26).

In my treatment of *M. rosea* Oliv. (K.B. **1952**: 411) I drew attention to variation in the structure of the corona ; similar variation is found in *M. distincta* and this has led to the description of both the plants listed in syonoymy.

Ceropegia nilotica *Kotschy* in Sitzungsb. Wien Math.-Nat. Akad. **51,** 356 (1865) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 447 (1903) ; Werderm. in Engl. Bot. Jahrb. **70,** 202 (1939).

C. brownii Ledger ex N. E. Br. in Kew Bull. **1909,** 326 (1909).

The *locus classicus* of this species, " near Gondokoro ", is in the Anglo-Egyptian Sudan, not Abyssinia as stated by Werdermann (1939). Werdermann, in his key, places *C. nilotica* in a group of species without " vibratile club shaped hairs " on the corolla lobes, but I am convinced that this is a mistake. I have not seen the type specimen (*Knoblecher* 35), but the absence of such hairs on a dried specimen is not very significant ; they cannot be seen until the flower is fully " open " and they are very easily detached. Werderman cites *C. brownii* as a synonym and the vibratile hairs were certainly present in that plant, grown by Ledger from a Mabira, Uganda, collection by E. Brown.

C. nilotica has been in cultivation at Kew during the last few years, where it flowers freely. The material was originally collected by Mr. P. R. O. Bally, (No. S. 181) at Kitale in Kenya Colony ; Kew specimens (*Pearson* 2142, 2146) from southern Angola, may also belong to this species. Its geographical distribution is thus shown to be an extensive one and the plant may be much less rare than has been supposed. The plant is a rampant climber with succulent stems and the fleshy leaves are comparatively few. The flowers, borne in pairs on axillary peduncles, are mainly green in colour and are probably so inconspicuous—in spite of their large size—that the plant may be overlooked.

Ceropegia denticulata *K. Schum.* in Engl. Pflanzenw. Ost Afr. **C,** 327, t. 40F (1895), et in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 272, f. 81A (1895) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 448 (1903) ; Werderm. in Engl. Bot. Jahrb. **70,** 201 (1939).

This species, described from southern Tanganyika, has now been collected several times in Kenya (*Bally* 1457, 7722 ; *Jex-Blake* 1148 ; *Bally* S.45). The first of these was collected at Kitale where, as noted above, Mr. Bally also collected *C. nilotica*. The two species are so very similar, differing mainly in the presence (*C. nilotica*) or absence (*C. denticulata*) of a constriction about the middle of the expanded basal

portion of the corolla tube, that I am inclined to the belief that they represent forms of the same species. I have no knowledge of the pollination mechanism of these plants ; in view of the presence of peculiar hairs within the corolla-tube and the vibratile cilia, it is likely to be complicated ; the possible existence of dimorphism as a further complication is not out of the question.

Ceropegia mozambicensis *Schltr.* in Journ. Bot. **33,** 273 (Sept. 1895) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 447 (1903) ; E. A. Bruce in Hook. Ic. Pl. t. 3441 (1943).

C. constricta N. E. Br. in Kew Bull. **1895,** 260 (Oct. 1895).

Schlechter recorded this species from the mouth of the Pungwe river in Portuguese East Africa and from the littoral fruticetum of Mombasa. Brown (1903) added the Congo locality of Kawal Is. in Lake Tanganyika and Miss Bruce (1943) recorded further localities in Kenya and Portuguese East Africa. As in the case of *C. nilotica* and *C. denticulata* it is a widespread species which is likely to be found in many other localities. Its inclusion in these notes is due to its affinity with *C. monteiroae* Hook. f., to which it bears the same relation as does *C. nilotica* to *C. denticulata*.

Ceropegia monteiroae *Hook. f.* in Bot. Mag. t. 6927 (1887) ; Schltr. in Journ. Bot. **35,** 294 (1897) ; N. E. Br. in Thiselton-Dyer, Fl. Cap. **4** (1), 816 (1908).

Hooker (1887) gives the definite information that Mrs. Monteiro collected this species and sent living material to Kew, at Delagoa Bay in 1884 ; it has not, apparently, been collected since then. It differs from *C. mozambicensis* in the absence of a constriction in the expanded basal portion of the corolla-tube and, as in the case of *C. nilotica* and *C. denticulata*, I again suggest that this difference may be no more than the expression of dimorphism in a single species.

Raphionacme splendens *Schltr.* in Journ. Bot. **33,** 301 (1895) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 271 (1902), et *l.c.* 614 (1904) ; K. Schum. in Engl. Bot. Jahrb. **33,** 322 (1903) ; De Wild. in Ann. Mus. Congo, Sér. 5, **1,** 181 (1904).

R. macrostemon MS. in Herb. Brux. ex K. Schum. *l.c.* in syn., nomen ; De Wild. in Ann. Mus. Congo, Sér. 5, **1,** 181 (1904), in syn.

The type of this species is unlocalised but it is almost certain that *Scott Elliot* collected it in the dry forest area of western Tanganyika, where the writer also found it in 1950.* K. Schumann (1903), has recorded it from the opposite side of Lake Tanganyika ; *Descamps* collected the specimen concerned near M'towa—doubtless in a similar woodland habitat, and De Wildeman (1904) recorded another specimen from Haut-Marungu, collected by *Debeerst* in 1896.

Both Schlechter and N. E. Brown are in error in suggesting that there may be upper leaves larger than the reduced basal phyllaries of the flowering stems ; the plant, as stated by De Wildeman (1904), is completely precocious and it must be assumed that leafy stems arise from

**Bullock* 3039 ; 3115 ; 3137 ; 3137A. All except 3039 include flowers in spirit.

the base after the flowering period, which is at the height of the dry season. It is now over fifty years since *Scott Elliot* collected the type in 1895 and the prospects for obtaining leaf specimens seem to be as remote as ever. It was found by the writer in the woodlands bordering the valley of the Moyowosi River, in a vast area depopulated as a sleeping sickness control measure, remote from all reasonable roads and practically impassable during the rains.

Raphionacme hirsuta (*E. Mey.*) *Dyer ex E. P. Phillips*, Gen. S. Afr. Fl. Pl. ed. 2, 596 (1951), lectotypus nominis generici.

Brachystelma ? *hirsutum* E. Mey. Comm. Pl. Afr. Austr. 197 (1837).

Raphionacme divaricata Harv. in Hook. Lond. Journ. Bot. **1,** 23 (1842) ; N. E. Br. in Thiselton-Dyer, Fl. Cap. **4** (1), 538 (1909).

Dr. Phillips (1951) quoted this species as the type of the generic name, but it must be noted that this can be accepted only so long as the synonymy given above is regarded as correct. Harvey (1842) established the genus *Raphioacme* to accommodate the two species *R. zeyheri* and *R. divaricata*, without citing a generic type. *R. divaricata*, which is well known and widely distributed in South Africa, is an excellent choice, and it is unfortunate that its name must be changed to *R. hirsuta*.

Raphionacme brownii *Scott Elliot* in Journ. Linn. Soc. Bot. **30,** 91 (1894) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 273 (1902) ; Hutch. et J. M. Dalz. Fl. W. Trop. Afr. **2,** 53 (1931) ; J. M. Dalz. Useful Pl. W. Trop. Afr. 389 (1937).

R. excisa Schltr. in Journ. Bot. **33,** 301 (1895) ; N. E. Br. in Thiselton Dyer, Fl. Trop, Afr. **4** (1), 272 (1902).

R. brownii var. *longifolia* A. Chev. Expl. Bot. Afr. Occ. Franç. 430. (1920), nomen.

N. E. Brown (for whom Scott Elliot named this species), separated *R. brownii* from *R. excisa* on account of the longer corolla-lobes of the latter ; Schlechter mentioned, but did not enumerate, differences in the corolla and in the corona. Examination of the more abundant material now available leads me to conclude that the differences observed by Brown and by Schlechter are not more than may be expected in flowers of different ages taken from different individuals, and I have therefore reduced Schlechter's *R. excisa* to synonymy.

Dalziel (1937) lists a number of native names for the species, which occurs from Senegal eastwards to the Anglo-Egyptian Sudan, and is widely used as a bush food. The laticiferous outer layers of the large tubers are removed and the tuber is then eaten either raw or roasted. Dalziel mentions reports that over-eating of the tubers has toxic effects, but these reports are from the French Sudan, where it is possible that *R. jurensis* N. E. Br. may be mistaken for it.

Raphionacme jurensis *N. E. Br.* in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 272 (1902).

? *R. sudanica* A. Chev. Expl. Bot. Afr. Occ. Franç. 430 (1920), nomen, ex Hutch. et J. M. Dalz. Fl. W. Trop. Afr. **2,** 53 (1931), in clavi.

The long staminal filaments and exserted stigma of this species serve to distinguish it at once from *R. brownii*, in which the filaments are very short and the stigma is not exserted beyond the mouth of the corolla tube.

In both species the stamens (in this genus the filaments are free from each other) and the filiform processes of the corona, arise from fleshy tubercles situated at the throat of the corolla and decurrent as five fleshy ridges to the base of the corolla tube. In *R. brownii* the tubercles are closely appressed to the stigmatic cone, whereas in *R. jurensis* they are appressed to an annular swelling of the style. In both cases the corolla tube is closed, but the significance of the closure is obscure. The shorter corolla tube of *R. jurensis* exactly corresponds to the exsertion of the stigma, the style being of the same length as in *R. brownii*.

These facts led me to consider whether these two plants represented heteromorphic forms of a single species of a kind more familiar in the heterostyly of such genera as *Primula*, *Lythrum* or *Narcissus*, but observations made by my colleague Mr. R. D. Meikle in Northern Nigeria do not encourage such a view. He has informed me that there is a small but constant difference in the flower colour and in the distribution of green and red-purple in the various parts of the flower. In addition, he informed me that the ecology of the two species is different. *R. brownii* is a plant of open woodlands, whereas *R. jurensis* occurs on open, usually rocky ground too poor to support a tree vegetation. Mr. Meikle collected *R. brownii* in the open *Isoberlinia* woodlands of the Zaria Division, Northern Nigeria, where it was abundant and from which *R. jurensis* was absent. Further north, in the Iborin Division, the position was reversed and *R. jurensis* was abundant on treeless rocky slopes.

Collector's notes from areas further west do not strongly support Mr. Meikle's ecological observations, but the evidence is of a negative kind. Scott Elliot himself, who collected the type of *R.brownii* near Falaba, Sierra Leone, wrote " growing on dry schistose rocks ", whilst Chipp writing of his number 76, collected at Sunyani, Gold Coast, said " growing on laterite rocks with scanty soil surface ". Neither collector mentions a tree cover, but I have seen a fairly dense *Brachystegia-Isoberlinia* woodland on similar inhospitable sites in East Africa. I am therefore inclined to accept the ecological separation of *R. brownii* and *R. jurensis*, as observed by Mr. Meikle, as a reliable distinction between them.

The distribution of the two species may be tabulated as follows :—

	French Guinea	Sierra Leone	Gold Coast	Togo	Dahomey	N. Nigeria	French Sudan	Chad Territory	A.-E. Sudan	Uganda	Tanganyika	Nyasaland	Moçambique
R. brownii	×	×	×	×	×	×	×	×	×	×			
R. jurensis...			×			×	×	×	×	×	×	×	×

Raphionacme linearis *K. Schum.** in Engl. Bot. Jahrb. **17,** 117 (1893), incl. var. *puberula* et var. *glabra*, et in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 221, f. 64 M–N (1895) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 270 (1902), incl. var. *glabra* ; Schltr. in Warb. Kunene-Sambesi-Exped. Baum, 340 (1903).

I have not seen the type material of this species, but the specimens available suggest to me that there is no justification for the maintenance of two varieties. The type material (*Mechow* 359, *Buchner* 569) probably no longer exists, but there is a rough sketch of a flower labelled, " drawn from the type by C. B. Clarke. Natural size," in N. E. Brown's hand, at Kew together with the following collections :—

Angola. District of Moxico. S.E. of Lusavo Falls in grassland among flat rocky outcrops and *Aeschynomene* shrubs 8–10 ft. high ; " perennial with cylindrical fleshy rootstock, stems erect, leaves dull green, erect, margins curved downwards, pale below, stem brownish, pedicels dull purple, corolla *Clematis*-like, lobes outside at the base and tube mauve, lobes higher up violet-blue, folded backwards, corona white " ; 12 Jan. 1938, *Milne-Redhead* 4085. Kuebe, 1170 m., 23 Oct. 1899 (fl.), *Baum* 306.

Mr. Milne-Redhead's collection includes spirit material.

Raphionacme globosa *K. Schum.* in Engl. Bot. Jahrb. **17,** 118 (1893), et in Engl. et Prantl, Naturl. Pflanzenfam. **4** (2), 221 (1895) ; Hiern in Cat. Afr. Pl. Welw. **1** (3), 679 (1898) : N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 271 (1902).

A duplicate of the type specimen, *Mechow* 327 from Malange, Angola, is preserved at Kew ; the first collection of the plant was, however, by *Welwitsch* (No. 4178) in 1859, in the Huilla region of Angola. This (unique) specimen is preserved in the British Museum Herbarium. So far as I am aware these are the only recorded specimens and the following are, therefore, of some interest :—

Northern Rhodesia. Mwinilunga District. Slope to the north of Matonchi Farm, in *Brachystegia* woodland ; " herb with tuber 3–4 ins. long, widest below, flowers at apex of shoot only, corolla and corona pale green tinged dull purple " ; 4 Oct. 1937 (fl.), *Milne-Redhead* 2561 (with material in spirit). Just south of Matonchi Farm ; " unripe fruits terete, green " ; 15 Dec. 1937 (young fr.), *Milne-Redhead* 3687.

Mr. Milne-Redhead's flowering specimen differs from the type in having shorter calyx-lobes and his field notes indicate a colour-variation from the " white " of Welwitsch's field note and Brown's description. The leaves of Mr. Milne-Redhead's specimens are also narrower than in the type and there is a tendency to produce weak lateral branches on the essentially simple erect stems.

A specimen from Lakilana, Kyimbila District, Tanganyika (*Stolz* 1066), differing in some respects from Mr. Milne-Redhead's material, but having similar short calyx lobes and flower colour also probably belongs here.

*K. Schumann adopted the spelling *Raphiacme* or *Rhaphiacme* for Harvey's generic name, on the plea that Harvey used the wrong stem. Apparently *Raphidacme* would be more correct, but Harvey's spelling must be retained.—A.A.B.

Raphionacme keayii *Bullock*, sp. nov., habitu *R. longifoliae* N. E. Br. sed caulibus foliisque densius longiusque pubescentibus, foliis brevioribus pro rata latioribus, inflorescentiis congestioribus, floribus paucioribus multo majoribus facile distinguitur.

Herba laticifera, perennis ; *caules* simplices, erecti, superne saltem (regione florifera) sympodiales, usque 1 m. alti, striati, satis dense crispato-pubescentes, e radice tuberosa magna orti. *Folia* stricte opposita, brevissime vel obsolete petiolata, basalia cataphyllaria, parva, superiora reducta, intermedia majora, oblongo-lanceolata, usque 12 cm. longa et 2 cm. lata, apice subacuta sed haud acuminata, basin versus gradatim angustata, marginibus (saltem sicco) leviter recurvis, nervis lateralibus paucis indistinctis, utrinque crispato-pubescentia, subtus (vivo) glauca. *Inflorescentiae* habitu axis sympodiali velut ex axillis foliorum superiorum reductorum ortae sed ob axem tortum velut unilateraliter dispositae, cymosae, crispato-pubescentes, ramo centrali obsoleto unifloro, ramis 2 lateralibus brevibus et plurifloribus. *Flores* pedicellati, pedicellis 4–6 mm. longis post anthesin paullo longioribus apicem versus sensim incrassatis basi bracteolatis ; *bracteolae* caducae, membranaceae, pubescentes, oblongo-ovatae, subacutae, plus minusve 2 mm. longae. *Calyx* profunde (fere ad basin) 5-partitus ; lobi triangulares, subacuti, 2 mm. longi, extra leviter puberuli vel papillato-puberuli. *Corolla* hypocrateriformis, tubo cylindrico plus minusve 2 mm. longo, lobis aestivatione subvalvatis sub anthesi patentibus vel demum reflexis triangularibus 5–6 mm. longis basi 3·5–4 mm. latis apice acutis vivo viridibus sed intus basin versus sordide sanguineo-zonatis extra intusque minute papillato-puberulis. *Coronae lobi* erecti, e basi filamentorum staminalium carnoso-incrassatorum orti, sordide sanguinei, partibus basalibus transverse rectangularibus 2·5 mm. latis 1 mm. altis marginibus superioribus utrinque apiculatis vel 1–2-dentatis, partibus superioribus ex appendicibus singulis centralibus viridibus linearibus 4·5 mm. longis constantibus, apicibus appendicum papillatis flexuosis supra stigma inter se conniventibus. *Stamina* corollae fauce inserta, filamentis basi carnoso-incrassatis corollae in tubum decurrentibus partibus liberis 1 mm. longis superne gradatim angustatis, antheris pallide luteis connatis triangularibus 2 mm. longis. *Pollinia* falcato-spathulata. *Stylus* apice abrupte conico-expansus, cum ovario 6 mm. longus, parte conica 3 mm. alta basi 5-saccata. *Folliculi* non visi.

Northern Nigeria. Zaria Province, Mando Forest Reserve. Between Mando and Kwaga, in *Isoberlinia tomentosa* open woodland on a stony ridge ; " erect herb to 1 m. high, leaves glaucous below, petals green with a dull crimson band near the base within, corona-lobes dull crimson with green appendage, anthers pale yellow " ; 22 July 1950 (fl.) *R. W. J. Keay* F.H.I. 25983 ; *loc. cit.* east of Kargi, in *Isoberlinia-Uapaca* open woodland ; " erect herb to 1 m. high, with large fleshy tuber, white latex, leaves glaucous below, petals green with a dull crimson band near the base within, corona lobes dull crimson with green appendages, anthers pale yellow " ; 30 July 1950 (fl.) *R. W. J. Keay* F.H.I. 25990 (*typus specei, in herb. Kew.*).

Cameroons. Beretum, 6° 10′ N., 16° 20′ E., about 800 m. ; 21 June 1914 (fl.), *J. Mildbraed* 9664.

Both of Mr. Keay's collections include inflorescences preserved in

spirit, and the description of the flowers has been drawn up from this material. Mr. Keay informs me that the plant is rare ; he has transplanted tubers to Ibadan, but there is as yet no information as to their fate. Fruiting material of the species is a *desideratum*, but it is unlikely that the follicles will differ markedly from the long, narrowly linear ones common to other species of the genus.

Baseonema gregorii *Schltr. et Rendle* in Journ. Bot. **34,** 97, t. 356 (1896) ; K. Schum. in Engl. et Prantl, Naturl. Pflanzenfam. Nachtr. zum **2–4,** 286 (1897) ; N. E. Br. in Thiselton-Dyer, Fl. Trop. Afr. **4** (1), 259 (1902).

The genus *Baseonema* was established by Schlechter and Rendle (1896) to accommodate their new species *B. gregorii*, itself based on a single specimen collected by *J. W. Gregory* (No. 14) at Kinani, East Ongalea Mountains, Kenya Colony, in 1893. The specimen is in the British Museum herbarium where there is also another collected by *Kässner* at Kibwesi in April, 1902. After comparing these two specimens, Mr. W. T. Stearn has very kindly sent me the following report :—" *T. Kässner* no. 705, Kibwesi [Kenya Colony], 27.4.02 in this herbarium seems a good match for the type the former is the better specimen and is evidently twining, whereas no twining shoots are present on the type ". Hitherto unrepresented at Kew, the plant has now been sent there from northern Tanganyika by Mr. P. R. O. Bally :—

Tanganyika Territory. Lembeni, in dry scrub ; " small shrub, leaves very velvety, stalks of the infloresence red, shiny, corolla lobes reflexed, green, shiny " ; 2 April, 1952 (fl.), *P. R. O. Bally* 8125.

Mr. Bally adds the note that he found only one specimen. Mr. Stearn's note, drawing attention to the fact that the stems may become twining, is of some interest. In my treatment of *Ceropegia abyssinica* (K.B. **1952**: 424) I mentioned a similar habit variability and have observed in Northern Rhodesia the same character in *Raphionacme denticulata* N. E. Br. I believe the variation to be entirely due to the immediate conditions of the environment and that the same plant may be a twiner during some years and a non-twiner during others.

In a paper read before the Wernerian Natural History Society on 4th November, 1809, and published in the first volume of the Society's Memoirs in 1811, Robert Brown announced his separation of the *Asclepiadaceae* from the *Apocynaceae*. In this paper, he described several new genera, most of them based on species described by earlier authors. He did not, however, make the necessary new combinations. Under *Xysmalobium*, for example, he makes the observation, " This genus at present consists of only two species, *Asclepias undulata* and *grandiflora* ".

Robert Brown's new genera were at once accepted by his contemporaries and all the transfers suggested by him were made by other authors, who attributed them to him. Below is a list of the names concerned which affect African species. All of them appear in the *Flora Capensis* or the *Flora of Tropical Africa* ; some are now regarded as synon-

nyms and in these cases I have indicated the name under which they may be found.

The date of publication of Brown's paper is in doubt. A separately paginated reprint in the Kew library, was probably issued about the time that the paper was presented to the Society, but it seems clear that the complete volume appeared in 1811, the date on the title page. The appropriate new genera, however, appear in Brown's *Prodromus*, published in 1810, where Brown cites his original paper with the volume pagination. In these circumstances it is convenient to adopt the date 1809 for the new genera, as has been done for the *Index Kewensis* citations.

I have, somewhat reluctantly, retained the spelling *Huernia* for the genus named in honour of Justus Heurnius, who was probably the first European collector of Cape plants. In his series of papers on the correct spelling of generic names, Sprague (Kew Bull. **1929**, 242 : 1929) considered that Robert Brown deliberately adopted the spelling *Huernia* on grounds of euphony and he pointed out that this spelling occurs no fewer than three times in Brown's paper, whereas " *Heurnia* " does not appear at all. Sprengel (1825) and Dietrich (1840) adopted the spelling *Heurnia* without comment. K. Schumann (1895) regarded *Huernia* as a clear case of orthographic or typographic error, and Hutchinson more recently (*A Botanist in Southern Africa*, 1946) took the same view.

It must be noted that the names given below do not necessarily reflect the writer's taxonomic views, except where this is expressly stated. I am indebted to Miss M. I. Skan for checking the references and for a number of corrections.

Huernia campanulata (*Masson*) *Haw.* Syn. Pl. Succ. 28 (1812).
Stapelia campanulata Masson, Stap. 11, t. 6 (1796).

Huernia guttata (*Masson*) *Haw.* Syn. Pl. Succ. 30 (1812).
Stapelia guttata Masson, Stap. 10, t. 4 (1796).

Huernia venusta (*Masson*) *Haw.* Syn. Pl. Succ. 29 (1812).
Stapelia venusta Masson, Stap. 10, t. 3 (1796).

Piaranthus punctatus (*Masson*) *Schultes*, Syst. Veg. **6,** 9 (1820).
Stapelia punctata Masson, Stap. 18, t. 24 (1796).

Piaranthus pullus (*Ait.*) *Haw.* Syn. Pl. Succ. 44 (1812).
Stapelia pulla Ait. Hort. Kew. ed. 1, **1,** 310 (1789).
This is the *Caralluma mammillaris* (Linn.) N. E. Br. of the *Flora Capensis*.

Caralluma adscendens (*Roxb.*) *Haw.* Syn. Pl. Succ. 47 (1812).
Stapelia adscendens Roxb. Pl. Coast of Corom. **1,** t. 30 (1795).
An Indian plant, included here because it is the type of the generic name.

Gymnema sylvestre (*Retz.*) *Schultes*, Syst. Veg. **6,** 57 (1820).
Periploca sylvestris Retz. Obs. Bot. **2,** 5 (1781).

Gomphocarpus arborescens (*Linn.*) *Ait. f.* Hort. Kew. ed. 2, **2,** 79 (1811).

Asclepias arborescens Linn. Mant. Alt. 216 (1771).

This is the *Asclepias rotundifolia* Mill. of the *Flora Capensis*.

Gomphocarpus fruticosus (*Linn.*) *Ait. f.* Hort. Kew. ed. 2, **2,** 80 (1811).

Asclepias fruticosa Linn. Sp. Pl. 216 (1753).

I have K.B. **1952**: 406 previously drawn attention to this species.

Gomphocarpus setosus (*Forssk.*) *Schultes*, Syst. Veg. **6,** 87 (1820).

Asclepias setosa Forssk. Fl. Aegypt. Arab. 51 (1775).

Gomphocarpus crispus (*Berg.*) *Ait. f.* Hort. Kew. ed. 2, **2,** 79 (1811).

Asclepias crispa Berg. Descr. Pl. Cap. 75 (1767).

Xysmalobium undulatum (*Linn.*) *Ait. f.* Hort. Kew. ed. 2, **2,** 79 1811).

Asclepias undulata Linn. Sp. Pl. 214 (1753).

Xysmalobium grandiflorum (*Linn. f.*) *Schultes*, Syst. Veg. **6,** 90 (1820).

Asclepias grandiflora Linn. f. Suppl. 170 (1781).

This is the *Pachycarpus grandiflorus* (Linn. f.) E. Mey. of the *Flora Capensis*.

Kanahia laniflora (*Forssk.*) R. Br. in Salt, Voy. Abyss., App. p. lxiv (1814).

Asclepias laniflora Forssk. Fl. Aegypt. Arab. 51 (1775).

I have already given new synonymy for this species (K.B. **1952**: 421).

Sarcostemma viminale (*Linn.*) *R. Br.* Prodr. Fl. Nov. Holl. 464 (1810).

Euphorbia viminalis Linn. Sp. Pl. 452 (1753).

Sarcostemma aphyllum (*Thunb.*) Schultes, Syst. Veg. **6,** 116 (1820).

Asclepias aphylla Thunb. Prodr. Pl. Cap. 47 (1794).

This is the *Cynanchum sarcostemmatoides* K. Schum. of the *Flora Capensis*.

Eustegia hastata (*Thunb.*) *Schultes*, Syst. Veg. **6,** 119 (1820).

Apocynum hastatum Thunb. Prodr. Pl. Cap. 47 (1794).

This is the *Eustegia minuta* (Linn.) R. Br. of the *Flora Capensis*, but the name should be attributed to N. E. Brown as indicated below.

Eustegia minuta (*Linn. f.*) *N. E. Br.* in Thiselton-Dyer, Fl. Cap. **4** (1), 761 (1908).

Apocynum minutum Linn. f. Suppl. 169 (1781).

Astephanus triflorus (*Linn. f.*) Schulte, Syst. Veg. **6**, 122 (1820).

Apocynum triflorum Linn. f. Suppl. 169 (1781).

By exclusion of the remaining synonyms mentioned by Robert Brown, this is N. E. Brown's implied lectotype of the generic name.

Astephanus cordatus Thunb. Schulte, Syst. Veg. **6**, 123 (1820).

Apocynum cordatum Thunb. Prodr. Pl. Cap. 47 (1794).

This is referred to *Tylophora cynanchifolia* E. Mey. in the *Flora Capensis*, but the correct name is *T. cordata* (Thunb.) Druce in Rep. Bot. Exch. Club Brit. Isles, **1916**, 651 (1917).

Astephanus lanceolatus (Thunb.) Schulte, Syst. Veg. **6**, 123 (1820).

Apocynum lanceolatum Thunb. Prodr. Pl. Cap. 47 (1794).

This is cited as a synonym of the *Glossonema lineare* (Linn. f.) E. Mey. of the *Flora Capensis*.

Astephanus linearis (*Linn. f.*) Schulte, Syst. Veg. **6**, 123 (1820).

Apocynum lineare Linn. f. Suppl. 169 (1781).

This is the *Glossonema lineare* (Linn. f.) E. Mey. of the *Flora Capensis*.

Plant Names*.—The publication of another key to British Plant-names so soon after the appearance of Mr. Gilbert-Carter's "Glossary of the British Flora" (1936) invites a comparison between the two works.

Mr. Gilbert-Carter's little book has been long enough in our hands to prove itself thoroughly useful—straightforward, reliable and garnished with those personal touches and details which enliven a subject too often ruled by pedantry.

Mr. Macleod's book is rather more elaborate. It contains a long introductory, a useful and readable feature, even if at times a trifle naïve: to say (p. 1) that "as regards scientific names, Bentham and Hooker's list is certainly the most authoritative one available" rather takes one's breath away, and the world will smile when he reads that "scientific names possess the supreme merit that, generally speaking, they always mean the same thing to every botanist of every nationality" (p. 14). But, on the whole, Mr. Macleod skates fairly successfully over some very thin ice.

The glossary itself is divided into three parts: Scientific names (chiefly Generic names), Specific names, and Common names, a unfortunate arrangement which will not appeal to everyone. The Scientific portion is handicapped by the author's partiality for Bentham and Hooker, so

*Key to the Names of British Plants, by R. D. Macleod. London, Sir Isaac Pitman & Sons, Ltd., 1952. pp. 94, price 12/6 net.

that generic concepts are those of another age, and many plants which should have been mentioned are passed over in silence. The derivations show that Mr. Macleod is well versed in Latin and Greek, though occasionally he throws caution to the winds, as in *Ruscus*, *Origanum* and *Scirpus*, and offers explanations which few will find palatable.

The section on Common names is perhaps the most interesting in the book, though here again the author has frequently given ingenuity too much rein ; to be told that " Yorkshire Fog " is so named " from the down with which it is covered " is neither very accurate, nor very explicit.

R. D. Meikle.

Pollen*.—In " The Pollen Loads of the Honey Bee " the author, who is an artist by profession and an enthusiastic beekeeper, has also shown herself to be a competent observer and field worker. She has brought to light many interesting new facts in regard to pollen, especially in connection with the colour of pollen. Her work illustrates the range in colour that may exist in the pollen, of a single species, also the changes in colour that may result with ageing or which may be induced by climatic and other factors. Another interesting feature of her work is the correlation of the size and shape of the bee pollen load with the botanical source which has been shown to apply with many species.

Over a number of years the author recorded in water colour, the colour of pollen of some 120 species that are visited by the hive bee in the south of England. These colours are reproduced for each species in the form of a colour chart at the end of the book, which is most illuminating even to the most casual of observers. The skill of the artist is shown in the charming coloured plates of the honey bee and the pollen packing process that are in the book. A similar high standard is shown in the line drawings of pollen grains which includes all the commoner bee plants of the British Isles. These should prove of value to anyone interested in the microscopical structure of pollen or to those concerned with the identity of pollen.

The text is well written in a pleasing easy style. Considering the wealth of illustration and colour work in the book the price is very reasonable under present-day conditions. As Dr. Anna Maurizio, the eminent Swiss authority on pollen states in her foreword " Because the main emphasis is laid on the colour chart and the pollen drawings the book is largely independent of language barriers and will be appreciated in many countries."Many will agree with this remark and that this graphic study of the relationship between bees and flowers has been presented in a way that will interest not only beekeepers and botanists, but also teachers, students and all who are interested in nature.

F. N. Howes.

*The Pollen Loads of the Honey Bee. By Dorothy Hodges. pp. 51 plus colour chart and numerous illustrations. Bee Research Association Ltd., London, 1952. Price 21s. or $3.

REVISION OF THE " FLORA OF WEST TROPICAL AFRICA ". —III.

R. W. J. Keay.

ANNONACEAE

Monocyclanthus *Keay* gen. nov. *Flores* bisexuales. *Calyx* leviter trilobatus, patelliformis. *Petala* 6, calyce multo longiora, aequalia, uniseriata, libera, omnino valvata, in alabastro conico sepalis non occulta. *Receptaculum* ellipsoideum. *Stamina* numerosissima dense conferta ∞-seriatim imbricata, linearia plano-compressa ; connectiva ultra thecas lineares rimis extrorsis dehiscentes producta, truncata dilatata. *Carpella* libera, circiter 7, apice receptaculi brevistipitata, extra pilosa, stylo continuo truncato marginibus omnino involutis. *Ovula* 6–8, biseriata. *Fructus* ignotus.

Arbor. *Folia* alterna. *Flores* fasciculis paucifloris in ramis adultis orti.

Monocyclanthus vignei *Keay* sp. nov. un. (Fig. 1).

Arbor usque 7 m. alta, trunco 15 cm. diametro. *Ramuli* glabri cortice primum pallide brunneo (in sicco) deinde nigrescente. *Folia* petiolis tumidis sulcatis glabris 5–7 mm. longis ; laminae ubique glabrae, oblongo-ellipticae, basi cuneatae, apice sensim acuminatae, margine integrae, 17–21 cm. longae, 6–7 cm. latae ; nervi laterales primarii utrinsecus mediani 12–15 arcuato-adscendentes procul marginem anastomosantes et conjuncti ; nervi laterales secundarii cum rete venularum et primariis utrinque prominentes. *Flores* fasciculis paucifloris in ramis adultis orti ; pedicelli adpresse puberuli, 4–5 mm. longi, circiter 1·25 mm. diametro. *Calyx* patelliformis, leviter trilobatus, 5–6 mm. diametro, extra sparse adpresseque puberulus, intus glaber. *Petala* 6, uniseriata, omnino valvata, in alabastro conico sepalis non occulta, aequalia, triangulari-lanceolata, 14–16 mm. longa, usque 4–6 mm. lata, more calyci vestita. *Receptaculum* ellipsoideum, 4–5 mm. longum, circiter 2 mm. latum, staminibus numerosissimis 1·5 mm. longis additis 5-6 mm. longum 4–5 mm. latum. *Carpella* circiter 7 apice receptaculi super stamina orta, dense pilosa, obovoidea, circiter 1 mm. longa et lata stipitibus circiter 1·25 mm. longis, marginibus styli truncati glabris involutis. *Fructus* ignotus.

Gold Coast : Ankasa Forest Reserve, alt. 60 m., Dec. 1933, *Vigne* in *Gold Coast Forest Herb. No.* 3175 (FHO ; K) : tree 7 m. high and 15 cm. girth ; flowers yellow on old branches ; petals in one series. Western Province, Benso, alt. 60 m., Sept. 1940, *Vigne* in *Gold Coast Forest Herb. No.* 4744 (holotypus in For. Herb. Oxon.) : small undergrowth tree 7 m. high and 15 cm. girth ; flowers cauliflorous.

This new genus does not seem to have any very close affinity, but may perhaps stand somewhere between *Isolona* Engl. and genera of the *Uvaria* Linn. group. It resembles both genera in the androecium of numerous linear stamens and in the stigmas. From *Uvaria* it is distinguished by the petals being valvate in a single whorl and from *Isolona* by the petals and carpels both being free.

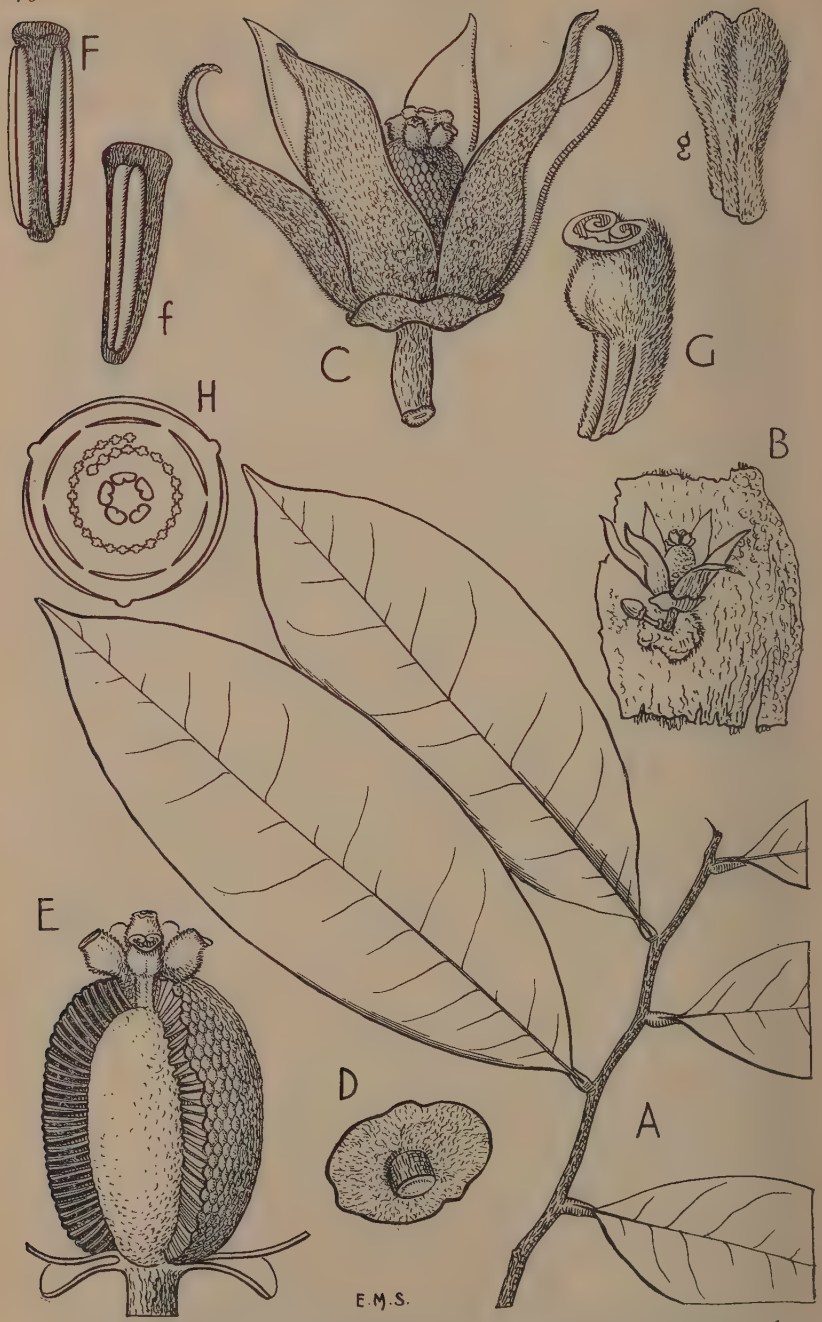


FIG. 1. *Monocyclanthus vignei* Keay—A : leafy shoot, × ½. B : inflorescence, × 1. C : flower, × 3. D : calyx, × 4. E : dissected flower, with some of the stamens removed to show the receptacle, × 5. F & f : stamen, × 20. G & g : carpel, × 10. H : floral diagram.
Drawn from *Vigne* FH.4744.

Monocyclanthus does not appear to be closely allied to *Monanthotaxis* Baill. which also has the petals valvate in a single series but of two sizes ; in addition this genus and its relatives have a smaller and definite number of unguiculate stamens.

Uvaria angolensis *Welw. ex Oliv.* subsp. **guineensis** *Keay* subsp. nov. ; a typo ramulis et foliis subtus densius pilis longioribus vestitis differt.

[*Uvaria cordata* (non Schum. et Thonn.)—Hutch. et Dalz. F.W.T.A. **1** : 50 (1927), pro parte, quoad spec. *Farquhar* 73 a].

Sierra Leone : sine loc., *Crichton* 159 (FHO).

British Togoland : Togo Plateau Forest Reserve, near Kadjakpe-Akpafu, alt. 300–310 m., 16 June 1935, *Adogla* in *Gold Coast Forest Herb. No.* 4080 (FHO) : a small straggly tree, dark brown bark covered with lichens ; narrow longitudinal fissures ; light brown fibrous slash with strong smell ; hard light brown wood ; yellow flowers.

Nigeria : Benin, Ukehe, 16 Sept. 1911, *Farquhar* 73 a (K). Onitsha Province, Enugu, Milliken Hill, 3 May 1946, *A. P. D. Jones* FHI. 18864 (FHI ; FHO) : scrambling shrub with stems up to 7–8 m. long, on steep sandstone cliff edge ; perianth segments rather brownish-yellow, waxy ; general indumentum light golden-brown ; carpels dull cream-brown. Sine loc. *Conservator of Forests, Enugu Nos.* 342 et 343 (FHO).

British Cameroons : Bamenda Province, Lakka, alt. 1250 m., June 1931, *Maitland* 1568 (K) : shrub or small tree on edge of forest.

French Cameroons : Mbussa, Lat. 6°N., Long 14° 20′ E., alt. 800–900 m., 29 April 1914, *Mildbraed* 9106 (K). Kunde, Lat. 6°N., Long. 14° 30′ E., alt. 900–1000 m., 3 May 1914, *Mildbraed* 9224 (typus subspeciei in Herb. Kew.). Buar, Lat. 6° N., Long. 15° 35′ E., alt. circa 1000 m., May 1914, *Mildbraed* 9486 (K).

The specimen *Farquhar* 73 *a* was included in the Flora of West Tropical Africa under *Uvaria cordata* Schum. et Thonn. Examination of the type specimen of *Uvaria cordata* Schum. et Thonn. shows however that this species is a synonym of *Uvaria ovata* (Dunal) A.DC. (see Keay in Kew Bull. **1952** : 543).

Mildbraed's excellent specimens from the Buar region of what is now the French Cameroons have been noted in the Kew Herbarium as a new species. The taxon appears however best treated as a subspecies of *Uvaria angolensis* Welw. ex Oliv. which is widespread in Belgian Congo, Uganda, Kenya, N. Rhodesia and Angola. (See Boutique in Fl. Congo Belge **2** : 295 (1951)).

Enneastemon *Exell* in J. Bot. **70,** Suppl. 1 : 209 (1932).

Further material of the type species of *Clathrospermum* Planch. ex Benth. & Hook. f. Gen. Pl. **1** : 29 (1862)—*C. vogelii* (Hook. f.) Planch.—shows that the petals are in a single series with the outer three petals overlapping the inner three in their upper portions, exactly as in *Enneastemon* Exell. The original description and illustration of the petals of this species, which were based on a poor specimen of a single flower, appear therefore to be incorrect in this respect. *Clathrospermum vogelii* is in fact

very closely related to *Enneastemon angustifolius* Exell and it is clear that the two genera must be regarded as one.

In view of the fact that *Clathrospermum* was incorrectly diagnosed on the basis of a single flower which no longer exists, and in view of the fact that *Enneastemon* has been used in the recent Conspectus Florae Angolensis, the Flore du Congo Belge et du Ruanda-Urundi and in several other papers, the latter genus is being proposed for conservation. *Clathrospermum* has not been used for more than 50 years. In anticipation of the proposed conservation, the following new combinations are necessary for species occurring in the F.W.T.A. area :—

Enneastemon vogelii (*Hook. f.*) *Keay* comb. nov.

Uvaria ? *vogelii* Hook. f. in Hook. Niger Fl. 208, t. 17 (1849).

Clathrospermum vogelii (Hook. f.) Planch. in Trans. Linn. Soc. **23** : 479 (1862) ; Oliver in F.T.A. **1** : 25, pro parte, quoad spec. *Vogel* 203.

Popowia vogelii (Hook. f.) Baill. in Adansonia **8** : 315 (1868) ; Engl. et Diels Monogr. Afr. Annonac. 50 (1901), pro parte, quoad spec. *Vogel* ; Hutch. et Dalz. F.W.T.A. **1** : 55 (1927), pro parte, quoad spec. *Vogel* 203.

Popowia dalzielii Hutch. in Kew Bull. **1927** : 152 (1927) ; F.W.T.A. **1** : 55 (1927).

[*Popowia barteri* (non Baill.)—Hutch. et Dalz. F.W.T.A. **1** : 55 (1927), pro parte, quoad spec. *Barter* 1221].

Type :—Nigeria, R. Niger, Stirling, *T. Vogel* 203 (K, holotype !).

Enneastemon barteri (*Baill.*) *Keay* comb. nov.

Popowia barteri Baill. in Adansonia **8** : 324 (1868) ; Hist. des Pl. **1** : 222, t. 256–260 (1869) ; Engl. et Diels Monogr. Afr. Annonac. 51, t. 21 (1901) ; Hutch. et Dalz. F.W.T.A. **1** : 55 (1927), pro parte, excl. spec. *Barter* 1221.

Popowia heudelotii Baill in Adansonia **8** : 321 (1868) ; Hist. des Pl. **1** : 221, t. 255 (1869) ; Engl. et Diels Monogr. Afr. Annonac. 51 (1901), pro parte, excl. spec. *Barter* s.n. ex Onitsha.

Clathrospermum heudelotii (Baill.) Sc. Elliot in J. Linn. Soc. **33** : 71 (1894), pro parte, excl. spec. *Barter* s.n. ex Onitsha.

Popowia nigritiana Bak. f. in Cat. Talb. Nig. Pl. 4 (1913) ; Hutch. et Dalz. F.W.T.A. **1** : 55 (1901).

Enneastemon nigritianus (Bak. f.) Exell in J. Bot. **72** : 28 (1934).

[*Popowia vogelii* (non (Hook. f.) Baill.)—Engl. et Diels Monogr. Afr. Annonac. 50 (1901), pro parte, quoad spec. *Scott Elliot* 4671 et 5656].

Type :—Sierra Leone, *Barter* s.n. (P, holotype ! K, isotype !).

Enneastemon mannii (*Baill.*) *Keay* comb. nov.

Popowia mannii Baill. in Adansonia **8** : 320 (1868) ; Hutch. et Dalz. F.W.T.A. **1** : 55 (1927).

Clathrospermum baillonii Sc. Elliot in J. Linn. Soc. **33** : 70 (1894).

Popowia baillonii (Sc. Elliot) Engl. et Diels Monogr. Afr. Annonac. 48 (1901).

[*Popowia vogelii* (non (Hook. f.) Baill.)—Engl. et Diels Monogr. Afr. Annonac. 50 (1901), pro parte, quoad spec. *Scott Elliot* 4020 et 5415].

Type :—Sierra Leone, Bagroo River, *Mann* 809 (P, holotype ! K, isotype !).

Uvariastrum elliotianum (*Engl. et Diels*) *Sprague et Hutch.* in Kew Bull. **1916** : 159 ; Keay in Kew Bull. **1952** : 151.

Uvariopsis chevalieri Robyns et Ghesq. in Ann. Soc. Sci. Brux. **53** : 318 (1933). Type :—Nigeria, Olokemeji, *Chevalier* 14069 (P, holotype !).

Uvariopsis chevalieri Robyns et Ghesq. was not mentioned in my previous notes (Kew Bull. **1952** : 151 et 155) but I have subsequently seen the type at Paris. It is in fruit and is undoubtedly *Uvariastrum elliotianum* var. *elliotianum*.

MENISPERMACEAE

Epinetrum cuneatum *Keay* sp. nov. ab *E. undulato* Hiern ramulis foliisque omnino glabris, foliis basin versus cuneatis vel in petiolum decurrentibus, apicem versus sensim longe acuminatis, bracteolis sepalisque exterioribus praeter marginem ciliolatam glabris, floribus longioribus, stipite quam columna staminum longiore differt.

Frutex scandens. *Ramuli* volubiles, glabri, nigrescentes, in longitudinem striati. *Folia* glabra, petiolis geniculatis 6–11 mm. longis ; lamina chartacea, omnino glabra, supra nitidula in sicco fusca, subtus pallidior, ovato-elliptica, basin versus cuneata vel in petiolum decurrens, basi ipsa rotundata, apicem versus sensim longe acuminata, apice ipso obtuso et mucronulato, margine incrassato-subrevoluta et (in sicco) ± undulata, 4·5–9 cm. longa, 2–4·5 cm. lata ; nervi laterales utrinque 6–8 adscendentes intra marginem arcuato-conjuncti, supra et subtus prominuli. *Cymae* ♂ axillares, 1–3-florae, pedunculo 1–3 mm. longo sparse puberulo ; flores subsessiles ; bracteolae 2, ovato-triangulares, circiter 0·8 mm. longae et latae, praeter marginem ciliolatam glabrae ; sepala exteriora 3, ovata, circiter 1·7 mm. longa, 1·1 mm. lata, praeter marginem ciliolatam glabra ; sepala interiora 3 in pseudocorollam anguste ovoideam apice breviter trilobam 5·5–6 mm. longam 3–3·5 mm. latam coalita, utrinque glabra ; petala 6, quinquangula carnosa, circiter 0·8 mm. in diametro ; stamina in columnam connata, stipite circiter 3 mm. longo, antheris circiter 30, 0·4–0·5 mm. longis et latis, loculis transverse dehiscentibus, sessilibus in quasi spadicem anguste ovoideum circiter 2·5 mm. longum et 1·5 mm. latum coalitis. *Flores* ♀ et *drupae* adhuc ignota.

Gold Coast : Yamoransa, near Cape Coast, 16–32 m. alt., 27 March 1940, *H. E. Box* 2588 (typus in Herb. Mus. Brit.) : climbing amongst trees and undershrubs in xerophytic woods on hills near the coast. Same locality, 2 May 1940, *H. E. Box* 2588 a (BM) : ♂ flowers and leaves in spirit.

Epinetrum ferrugineum (*Diels*) *Keay* comb. nov.

Anisocycla ferruginea Diels in Engl. Pflanzenreich Menisp. 92 (1902).

Synclisia ferruginea (Diels) Hutch. et Dalz. in Kew Bull. 1927 : 154, pro



FIG. 2. *Syrrheonema hexastamina* Keay—A: leafy shoot and ♀ inflorescences, × ⅔. B : ♂ flower bud, × 10. C : ♂ flower, × 10. D, E & F: ♂ sepals, × 10. G & g : ♂ petal, × 20. H : ♂ petals and synandrium, × 20. I : synandrium, × 20. J : stamens, × 20. K: ♀ flower, × 10. L, M & N: ♀ sepals, × 10. O: ♀ petal, × 20. P & p : staminodes, × 20. Q & R : carpels, × 20. S : fruits, × 1. T : endocarp × 2. A is drawn from *Box* 2602; B-J from *Box* 2413; K-R from *Box* 3248; S-T from *Box* 2739.

parte, quoad spec. *Buckley* in *Scott Elliot* 5751 et *Dinklage* 1686 ; F.W.T.A. **1** : 70 (1927).

[*Synclisia scabrida* (non Miers)—Diels in Engl. Pflanzenreich Menisp. 87–88 (1902), pro parte, quoad spec. *Buckley* in *Scott Elliot* 5751].

Type :—Liberia, Grand Bassa, *Dinklage* 1686 (B, holotype).

Syrrheonema hexastamina *Keay* sp. nov. (Fig. 2) ab *S. fasciculato* Miers staminibus 6, petalis 6 obdeltoideis, foliis ellipticis basi rotundatis vel subacutis differt.

Frutex scandens dioicus. *Ramuli* volubiles dense puberuli deinde glabrescentes. *Folia* petiolis geniculatis 3·5–4 cm. longis dense puberulis; laminae praesertim ad costas nervosque ubique sparse puberulae, ellipticae vel late ellipticae, basi rotundatae vel subacutae, apice oblique acutae vel acuminatae, costis in mucronulis productis, 9–18 cm. longae, 4·5–10 cm. latae ; nervi laterales primarii utrinsecus mediani 4–6, arcuato-adscendentes sub marginem anastomosantes et conjuncti, supra manifesti subtus prominentes ; rete venularum laxe reticulatum supra manifestum, subtus prominulum. *Capitulorum* ♂ 1–3 florum pedunculi 5–10 fasciculati 8–10 mm. longi, dense puberuli. *Sepala* ♂ 18 in 6 seriebus imbricata, extra dense puberula ; 12 exteriora rhomboidea circiter 1–1·5 mm. longa et lata ; 6 interiora oblonga 2–3·5 mm. longa, 1–1·5 mm. lata. *Petala* ♂ 6, obdeltoidea, unguiculata, apice longe ciliata, circiter 1·5 mm. longa, 1 mm. lata. *Stamina* 6, alte connata, filamentis latis, antheris parvis subimmersis omnino introrsis. *Capitulorum* ♀ 1-florum pedunculi fasciculati 12–15 mm. longi, dense puberuli. *Sepala* ♀ eis ♂ consimilia, sed 6 interiora ovato-oblonga. *Petala* ♀ rhomboidea, apice longe ciliata. *Staminodia* 6, clavata. *Carpella* 3–5, ovoidea, longe pilosa. *Fructus* monocarpis drupiformibus breviter stipitatis subglobosis sparse puberulis, 10 11 mm. diam. ; endocarpium et semen inaequaliter annulata.

Gold Coast : Central Province, Asuansi, alt. 100 m., 19 Feb. 1940, *H. E. Box* 2413 (typus in Herb. Mus. Brit.) : a thin somewhat woody climber in second-growth thickets on edge of forest ; ♂ flowers white. Same locality, 31 March 1940, *H. E. Box* 2602 (BM) : second-growth thicket on edge of forest ; ♀ flowers white. Same locality, 6 July 1940, *H. E. Box* 2739 (BM) : a climber in second-growth thickets and on the edge of forest ; fruits deep red in colour. Same locality, 13 July 1941, *H. E. Box* 3248 (BM) : a climber in second-growth thickets ; ♀ flowers whitish.

Material of all the above specimens is preserved in formalin.

VIOLACEAE

Tribus *Rinoreeae*

Gymnorinorea *Keay* gen. nov. a *Rinorea* Aubl., corolla zygomorpha petalo anteriore quam ceteris angustiore apice cucullato in alabastro apices petalorum ceterorum tegente, capsula cito praemature " loculicide " extendente, placentis in forma stellae 3-brachiatae crassescentibus semina nuda crescentia ferentis, seminibus maturis majoribus drupiformibus distinguenda.

Sepala 5, aestivatione imbricata, leviter inaequalia, posteriore ovato subcarinato, 2 lateralibus majoribus oblongis subcarinatis, 2 anterioribus suborbicularibus subplanatis posteriore subaequilongis. *Petala* 5, sepalis subduplo longiora, aestivatione imbricata, anteriore quam ceteris angustiore apice cucullato in alabastro apices petalorum lateralium et posteriorum tegente, petalis lateralibus et posterioribus anguste oblongis sub anthesin erectis vel apice paulo recurvatis. *Stamina* 5, basi in tubo connata, antheris in margine tubi sessilibus ; connectiva in laminis ovatis petaloideis ultra antheras producta. *Ovarium* superum, subglobosum, apice stylo uno elongato simplice praeditum, uniloculare, tricarpellare, cito " loculicide " aperiens, placentis medianis (revera marginalibus). *Ovula* obovata, anatropa, funiculis e placentis adscendentibus. *Placentae* post ovarium apertum in forma stellae 3-brachiatae crassescentes semina nuda crescentia ferentes, ad maturitate lignosae, utroque seminibus 4–10 confertis subsessilibus vel usque ad 3 mm. funiculatis praedita. *Semina* matura glabra, obovato-ellipsoidea vel subglobosa, drupiformia ; exotesta coriacea endotestam crustaceam laxe (in sicco) obtegens. *Embryo* rectus, radicula funiculo opposita ; cotyledones planae suborbiculares ; endospermium copiosum, obovoideo-ellipsoideum, embryonem praeter basi et apice circumdans.

Frutex erectus. *Ramuli* plus minus teretes, lenticellati. *Folia* alterna, simplices, breviter petiolata, petiolis supra leviter canaliculatis. *Inflorescentiae* cymosae, axillares, quam folia multo breviores ; pedicelli floribus subaequilongi prope basim articulati.

Typus generi :—*G. abidjanensis* (Aubrév. et Pellegr.) Keay.

Gymnorinorea abidjanensis (*Aubrév. et Pellegr.*) *Keay* comb. nov. (Fig. 3).

Rinorea abidjanensis Aubrév. et Pellegr. in Bull. Soc. Bot. Fr. **92** : 256 (1946) ; Aubrév. Fl. For. Côte d'Ivoire **3** : 26, t. 253, 6–8 (1936), *descr. gallice.*

[*Rinorea liberica* (non Engl.)—Cooper et Record in Yale Univ. Sch. For. Bull. **31** : 23 (1931).]

Type :—Ivory Coast, Abidjan, *Aubréville* 1517 (P, holotype !).

Liberia : Gbanga, 7 Sept. 1926, *Linder* 386 (K ; A) : bush, c. 2·5 m. high ; flowers pinkish ; in deep woods. Dukwia River, 7 Feb. 1929, *Cooper* 157 (K ; FHO) : shrub with large clusters of yellow-green berries [sic] with hard strong centres. Eastern Prov., Tchien Dist., Zwedru, 4 Aug. 1947, *Baldwin* 7010 (K) : flowers. Western Prov., Boporo Dist., Beiden, 13 Nov. 1947, *Baldwin* 10282 (K) : flowers. Sinoe Co., Greenville, 18 Mar. 1948, *Baldwin* 11557 (K) : fruit.

Ivory Coast : La reserve de Banco près d'Abidjan, Aug., *Aubréville* 1517 (P).

Gold Coast : Ankasa Forest Reserve, alt. 63 m., Dec. 1933, *Vigne* in *Gold Coast Forest Herb. No.* 3185 (FHO) : shrub to 2 m. ; yellow flowers and most curious development of ovules. Awaso, Afao Hills Forest Reserve, alt. 500 m., 19 Oct. 1943, *K. O. Darko* 35 (BM) : dominant undershrub in deciduous forest. Western Province, Aflao Hills Forest Reserve, *Akpabla* 898 (K) : shrub or small tree, fairly common in

E.M.S.

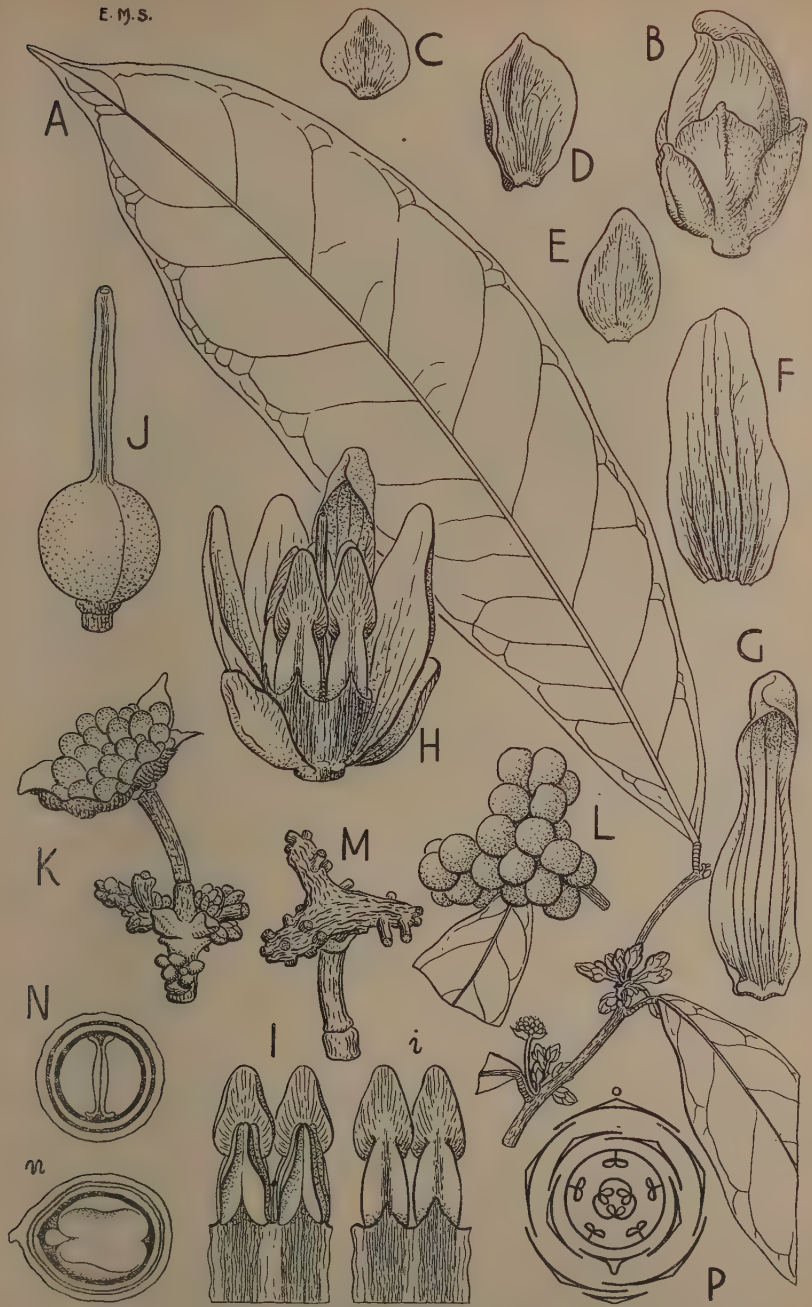


FIG. 3. *Gymnorinorea abidjanensis* (Aubrév. ét Pellegr.) Keay—A : flowering shoot, × ⅔ B : flower, × 5. C : posterior sepal, × 5. D : lateral sepal, × 5. E : anterior sepal, × 5. F : lateral petal, × 5. G : anterior petal, × 5. H : flower with one sepal and petal removed, × 5. I & i : stamens, × 5. J : ovary with style, × 5. K : burst ovary, with exposed ovules, × 2. L : mature, naked seeds of one fruit, × ⅔. M : mature placentae with seeds removed, × 2. N & n : transverse and longitudinal section of seed, × 2. P : floral diagram.

A-E and K are drawn from *Linder* 386 ; F from *Baldwin* 10282 ; L from *Baldwin* 11557 ; M and N from *Cooper* 157.

undergrowth of high forest ; flowers deep red in close panicles, fruits in clusters overhanging the branches.

This remarkable plant is now represented in the Kew Herbarium by good material from Liberia to the west, and from the Gold Coast to the east of the type locality in the Ivory Coast.

The corolla differs from *Rinorea* in being definitely zygomorphic with a curious anterior petal. This petal is narrower than the others but is hooded at the apex and covers the tips of the other petals in bud. It is however in the fruit that this plant is most remarkable.

The ovary has numerous ovules (more numerous it seems than in most species of *Rinorea*), and bursts at an early stage, probably just before or just after the fall of the petals. The developing ovules are thereby exposed when quite small and undergo most of their development in the open. This almost " gymnospermous " habit is paralleled in *Anchietea* (Violaceae), *Caulophyllum* (Berberidaceae), *Erythropsis fulgens* (Sterculiaceae), the *Dioncophyllaceae*, and to a lesser extent in *Reseda*.

Although this habit occurs within the *Violaceae* in *Anchietea*, it is clear that *Gymnorinorea* is more closely related to *Rinorea* than it is to *Anchietea*. In *Anchietea*, a small genus of scandent shrubs from tropical S. America, the anterior petal is markedly spurred and the seeds are broadly winged.

In *Gymnorinorea* the placentae of the opened " capsule " develop into a 3 (rarely 2)-armed star, each arm bearing 4–10 seeds in a manner resembling an apocarpus fruit of, for example, certain *Annonaceae*.

The seeds themselves are drupe-like having a coloured outer covering of leathery texture which surrounds the crustaceous endotesta containing the embryo embedded in copious endosperm. When first exposed the ovules are uniformly soft, but the more exposed parts quickly start to become tough and leathery. This differentiation of the testa starts at the apex of the ovule and evidently extends downwards to the funicle. Between the leathery exostesta and the crustaceous endotesta of the ripe seed may be found traces of withered membranous tissue containing vascular bundles. The micropyle can be seen in the young ovules of a newly burst ovary, but seems to be obscured as the testa develops its leathery outer layer. The outer leathery covering is interpreted as a exotesta rather than as an aril for the following reasons :—(1) the leathery tissue develops first at the top of the ovules, that is in the most exposed places, and extends downwards, (2) traces of the vascular bundles are found in mature seeds between the outer and inner coverings. The seeds of *Caulophyllum* are also drupe-like and apparently have a similar structure.

I am much indebted to several botanists of the Kew Herbarium staff for many valuable suggestions about the interpretation of this unusual plant, in particular to Dr. J. Hutchinson, F.R.S., Mr. Milne-Redhead and Mr. J. P. M. Brenan.

POLYGALACEAE

Polygala cristata *P. Taylor* sp. nov. affinis *P. Baikiei* Chod. sed floribus majoribus, carinis multo longius cristatis, seminibus multo longius pilosis differt.

Herba annua. *Caulis* erectus, leviter ramosus, striatus, strigosus, usque ad 90 cm. altus, 3 mm. crassus. *Folia* adscendentia, lineari-lanceolata, acuta, subsessilia, 5–17 cm. longa, 5–8 mm. lata, sparse pilosa vel glabrescentia, costa unica, margine anguste revoluta. *Flores* multi, inter se 3–6 mm. distantes, in racemis 15–30 cm. longis dispositi. *Bracteae* lanceolatae, acuminatae, subscariosae, hispidulae, circiter 3 mm. longae, valde reflexae. *Pedicelli* tenues, 1–2 mm. longi, sparse strigosi. *Sepala* exteriora inaequalia, viridia, margine scariosa, sparse hispida vel glabrescentia ; sepalum superius ovatum, circiter 6 mm. longum, valde carinatum ; sepala inferiora elliptica, circiter 4 mm. longa. *Alae* purpurae, orbiculatae, rotundatae, circiter 11 mm. longae et 9 mm. latae, glabrae, carinam subaequantes, multis nervis anastomosantibus praeditae. *Carina* galeata, basi unguiculata ; crista ad carinam adnata, multi-lacinata, laciniis longis undulatis usque 8 mm. longis ; *petala superiora* medio subito angulo subrecto sursum curvata, parte superiore ligulato glabro, parte inferiore dilatato hispidulo. *Stamina* 8, filamentis in summa 11 mm. longis, basim versus per 7 mm. in tubum connatis. *Ovarium* obcordatum ciliatum. *Stylus* circiter 12 mm. longus, parte inferiore tenui parte superiore torto et leviter dilatato. *Capsula* orbiculato-oblonga, anguste alata, in parte superiore ciliata. *Semina* ovoidea, circiter 4·5 mm. longa, fusco-brunnea, pilis longis albis vel pallide brunneis dense vestita ; caruncula alba, trilobata, circiter 1·5 mm. longa.

Sierra Leone : Northern Province. Koinadugu District :—Jigaya, 330 m. alt. 28 Sept. 1914, *N. W. Thomas* 2564 : Fundembaia 300 m. alt. 5 Oct. 1914, *N. W. Thomas* 2853* : Musaia (Musaia Chiefdom), 19 Dec. 1946. *Deighton* 4487 :—in orchard bush ; only one plant seen ; pale blue purple flowers, heavily veined ; Gberia Fotumbu (Sulima Chiefdom) 28 Sept. 1951, *Small* 289 (typus in Herb. Kew.) :—erect woody stemmed herb with hairy leaves and mauve to purple flowers ; seeds very hairy: Warantamba, (Sulima chiefdom), 1 Oct. 1951, *Small* 373 :—herb 8 feet tall, with purple flowers in 12 inch spike.

P. cristata has been confused with *P. baikiei* Chod. and *P. butyracea* Heck. The former has smaller flowers with the crest much more shortly laciniate, whilst the latter has the seeds glabrous except at the tips. *P. macrostigma* Chod., an east African species, is also closely related but has broader leaves and larger flowers.

SAMYDACEAE

Homalium aubrevillei *Keay* sp. nov. (§*Symphiostylium*) affinis *H. longistylo* Mast. sed foliis majoribus, paniculis floribusque ubique dense molliter pubescentibus, sepalis longioribus lanceolatis differt.

Arbor elata, usque 25 m. alta. *Ramuli* juniores glabri, cortice fusco nigrescente obtecti, seniores lenticellis pallide brunneis. *Folia* petiolis 4–6 mm. longis glabris, stipulis subulatis circiter 2 mm. longis cadu-

*I failed to find either of these localities on Sierra Leone maps, and am grateful to Mr. F. C. Deighton for the following suggestions. " Jigaya is presumably the village now written Igaia on Sierra Leone maps, in Kayak chiefdom, about half way between Lengekoro and Kabala. Fundembaia is probably Kondembaia, the Chief's town of Diang Chiefdom, due south of Kabala ".

cissimis ; laminae in sicco cupreo-brunneae, subcoriaceae, ubique glabrae praeter pauculos pilos in axillibus nervorum subtus, ellipticae vel oblongo-ellipticae, basi cuneatae, apice sensim acuminatae acumine ipso obtuso, margine irregulariter et leviter crenatae 4·12·5 cm. longae, 2·3–5·2 cm. latae ; nervi laterales utrinsecus mediani 6–9, arcuatim adscendentes sub marginem anastomosantes, supra manifesti vix prominentes, subtus prominentes ; rete venularum laxe reticulatum utrinque prominulum. *Paniculae* floribundae e foliorum superiorum axillis ortae, usque 15 cm. longae, ramulis lateralibus 4·7 divaricatis 2–6 cm. longis, ubique dense molliter brunneo-pubescentes ; flores in ramulis paniculae solitarii vel 2–4 in fasciculis dispositi ; bracteae subulatae minutissimae ; pedicelli circiter 2 mm. longi, ad apicem articulati post casus florum persistentes. *Alabastra* subglobosa, sepalis 5–6 lanceolatis dense pilosis 1·5–2 mm. longis divaricatis. *Receptaculum* brevissime turbinatum dense molliter pubescens, post anthesim accrescens. *Petala* 5 6 dense pilosa, sub anthesi oblonga 1·5–2 mm. longa, post anthesim obovato-oblonga certe usque 3 mm. longa accrescentes. *Stamina* 5–6 in alabastra inflexa, sub anthesi 5–6 mm. longa divaricata, antheris circiter 0·5 mm. longis instructa. *Stylus* circiter 3·5 mm. longus, apice 2–3-fidus, basi dense longiuscule pilosus. *Fructus* maturus ignotus.

Ivory Coast : Summit of Mt. Nuon, Nimba Mountains, alt. 1850 m., 30 March 1932, *Aubréville* 1130 (typus in Herb. Paris ; K). Necaounié, Lower Cavally, 26 May 1932, *Aubréville* 1311 (P ; FHO).

Vernacular Name : *Docla* (Kroumen) *fide* Aubréville.

This species was described and illustrated by Aubréville in his Flore Forestière de la Côte D'Ivoire (**3** : 22, t. 251, 1–3 (1936)) as *Homalium longistylum* Mast. ; it appears however to be distinct. The type of *H. longistylum* Mast. is *Mann* 1855 from Corisco Island, Spanish Guinea ; no other specimen of this species has since been found.

Homalium angustistipulatum *Keay* sp. nov. (§*Symphiostylum*) affinis *H. smythei* Hutch. et Dalz. sed ramulis junioribus paniculisque puberulis, stipulis linearibus persistentibus differt.

Arbor ? *Ramuli* juniores in sicco nigrescentes, sparse puberuli, seniores cortice cinereo-brunneo obtecti. *Folia* petiolis 5–10 mm. longis glabris, stipulis linearibus 4–5 mm. longis glabris persistentibus ; laminae juveniles subtus sparse puberulae praesertim ad costas nervosque, adultae subcoriaceae praeter costam subtus sparsissime puberulam ubique glabrae, oblongae vel oblongo-ellipticae vel oblongo-obovatae, basi cuneatae vel obtusae, apice subito acuminatae, acumine ipso obtuso, margine manifeste vel obscure crenatae utraque crena glandulo apicati, 8·5–13 cm. longae, 3·2–5·8 cm. latae ; nervi laterales primarii utrinsecus mediani 6–8 arcuato-adscendentes sub marginem anastomosantes et conjuncti supra prominuli subtus prominentes ; rete venularum laxe reticulatum supra manifestum subtus prominulum. *Paniculae* floribundae, terminales, 11–25 cm. longae, ramulis lateralibus 3–6 divaricatis 3–12 cm. longis, ubique puberulae ; flores in ramulis paniculae in fasciculis 2–6 floris vel solitarii dispositi ; bracteae lanceolatae 1–3 mm. longae, sub anthesi persistentes ; pedicelli circiter 3 mm. longi, 1 mm. supra basim articulati, parte inferiore post casus florum per-

sistente. *Receptaculum* turbinatum dense pubescens, sepalis 5-6 lanceolatis dense pubescentibus circiter 2 mm. longis ; alabastra obovoidea. *Petala* 5–6 dense pubescentes, sub anthesi oblonga circiter 2 mm. longa, post anthesim accrescentia, in fructu maturo membranacea manifeste nervosa, oblanceolata apice emarginata usque 8 mm. longa et 2 mm. lata. *Stamina* 5–6, circiter 3 mm. longa, antheris, circiter 0·4 mm. longis instructa. *Stylus* circiter 3 mm. longus, apice 2-3-fidus, basi dense longe pilosus. *Fructus* obconicus, circiter 2 mm. longus apice 2 mm. latus petalis accrescentibus stylo sepalisque persistentibus coronatus.

Gold Coast : Western Province, road from Essiama to Rice Mill, 1928, *W. Fishlock* 12 (typus in Herb. Kew.).

Homalium aylmeri *Hutch. et Dalz.* F.W.T.A. **1** : 166 (1927) ; Kew Bull. **1928** : 213 (1928).

H. alnifolium Hutch. et Dalz. F.W.T.A. **1** : 166 (1927) ; Kew Bull. **1928** : 212 (1928) ; non *H. alnifolium* Thwaites et F. Muell. in F. Muell. Fragm. Phytogr. Austral. **2** : 127 (1861).

OCHNACEAE

Ouratea oliveri (*Van Tiegh.*) *Keay* comb. nov.

Notocampylum oliveri Van Tiegh. in Ann. Sci. Nat. Ser. 9, **16** : 311 (1902).

Gomphia mannii Oliv. var. *brachypoda* Oliv. in F.T.A. **1** : 321 (1868).

Ouratea mannii var. *brachypoda* (Oliv.) Gilg in Engl. Bot. Jahrb. **33** : 258 (1903).

Type :—Nigeria, Calabar, *W. C. Thomson* 15 (K, holotype !).

Ouratea leroyana (*Van Tiegh.*) *Keay* comb. nov.

Monelasmum leroyanum Van Tiegh. in Ann. Sci. Nat. Ser. 9, **16** : 330 (1902).

Type :—Moyen Congo, *Leroy* s.n. (P, holotype !).

Ouratea sulcata (*Van Tiegh.*) *Keay* comb. nov.

Exomicrum sulcatum Van Tiegh. in Ann. Sci. Nat. Ser. 9, **16** : 340 (1902).

Ouratea oliveriana Gilg in Engl. Bot. Jahrb. **33** : 261 (1903) ; Hutch. et Dalz. F.W.T.A. **1** : 193 (1927) ; De Wild in Pl. Bequaert. **4** : 505 (1929).

[*Ouratea pobeguinii* (non (Van Tiegh.) A. Chev.)—A. Chev. Explor. Bot. 108 (1920), pro parte, excl. syn. *Monelasmum pobeguinii* Van Tiegh. ; Exell et Mendonça in Consp. Fl. Angol. **1** : 295 (1951), pro parte, excl. syn. *Monelasmum pobeguinii* Van Tiegh.].

Type :—British Cameroons, Johann-Albrechtshöhe, *Staudt* 606 (P, holotype ! K, isotype !).

Ouratea staudtii (*Van Tiegh.*) *Keay* comb. nov.

Rhabdophyllum staudtii Van Tiegh. in Ann. Sci. Nat. Ser. 8, **16**: 322 (1902).

Rhabdophyllum barteri Van Tiegh. l.c. (1902).

Ouratea barteri Hutch. et Dalz. in F.W.T.A. **1** : 193 (1927) ; Kew Bull. **1928** : 218 (1928).

Type :—French Cameroons, Lolodorf, *Staudt* 274 (P, holotype ; K, isotype !).

Ochna rhizomatosa (*Van Tiegh.*) *Keay* comb. nov.

Ochnella rhizomatosa Van Tiegh. in Journ. de Bot. **16** : 123 (1902) ; Ann. Sci. Nat. Ser. 8, **16** : 345 (1902).

Ochnella tenuis Van Tiegh. in Journ. de Bot. **16** : 122 (1902) ; Ann. Sci. Nat. Ser. 8, **16** : 345 (1902).

Ochna hillii Hutch. in Kew Bull. **1921** : 245 (1921) ; F.W.T.A. **1** : 191 (1927).

Type :—French Sudan, Koumantou, *Chevalier* 721 (P, holotype !).

CUCURBITACEAE

Coccinea barteri (*Hook. f.*) *Keay* comb. nov.

Staphylosyce barteri Hook. f. in F.T.A. **2** : 554 (1871).

Physedra barteri (Hook. f.) Cogn. in DC. Monogr. **3** : 525 (1881) ; Hutch. et Dalz. F.W.T.A. **1** : 183 (1927).

Type :—Nigeria, Nupe, *Barter* 1525 (K, holotype !).

Puya berteroniana.

With reference to the article (in Kew Bulletin **1952,** 501) there is a very striking photograph of this species, but incorrectly described as " *Puya caerulea* ", shown on the Frontispiece of T. Harper Goodspeed's botanical travel book " Plant Hunters in the Andes."

W. BALFOUR GOURLAY.

TROPICAL AFRICAN PLANTS : XXIII*

Unless otherwise localised, specimens cited are to be found in the Herbarium of the Royal Botanic Gardens, Kew. Abbreviations for other herbaria follow Dr. Lanjouw's standardised list published in Chron. Bot. **5,** 143 (1939).

Polygonaceae

Oxygonum buchanani (*Dammer*) *Gillett*, comb. nov.

Polygonum buchanani Dammer in Engl., Pflanzenw. Ost-Afr. **C,** 170 (1895) ; Baker & Wright in Thiselton-Dyer, Fl. Trop. Afr. **6,** 106 (1909).

The type and co-type show no anthocarps. *Stolz* 1090 has young anthocarps which have three obtuse triangular wings, leaving no doubt that the plant is an *Oxygonum*. The leaves are wider (up to 5·5 cm.) than those of any known species of *Oxygonum* from the continent of Africa but of about the same width as those of *O. tristachyum* (Baker) Perrier ex Gillett from Madagascar (see below).

Tanganyika. Kyimbila district north of Lake Nyasa, Rasambala, 20 Jan. 1912, *Stolz* 1090.

Nyasaland. Namasi, April 1899, *K. J. Cameron* 3. Shire Highlands, 1891, *Buchanan* 550 and 775 (Types).

Oxygonum tristachyum (*Baker*) *Perrier ex Gillett*, comb. nov.

Polygonum tristachyum Baker in Journ. Bot. **20,** 244 (1882).

This combination is made in m.s. on the sheet of *H. Perrier de la Bâthie* 16771 in the Kew Herbarium but has apparently not been published. The specimen shows large trigonous unwinged anthocarps.

J. B. Gillett.

Onagraceae

Jussiaea decurrens (*Walt.*) *DC.*, Prod. **3,** 56 (1828) ; Munz in Darwiniana, **4,** 198 (1942).

Ludwigia decurrens Walt., Fl. Carol. 89 (1788).

Gambia. Without precise locality, 1937, *D. H. Saunders* 5.

Nigeria. Ogoja Province, Ikom District. River Waiya, ferry on Ikom road, 18 Dec. 1950, *Keay* FHI 28289 :—on recently exposed sandy bank of river ; annual (or very young perennial) herb ; flowers bright yellow.

This species, from the United States, West Indies and South America, has not previously been reported from Africa. It is noteworthy on account of its narrowly winged stem, tetramerous flowers with rather large sepals and petals, and free seeds with narrow raphe. *Keay* 28289 has longer pedicels than usual (to 11 mm.) but similar ones can be seen on certain American specimens.

*Continued from K.B. **1950,** 389 (1951).

This may be an unintentional introduction into Africa, but at present it seems wiser to leave open the question of its status.

There is a considerable American synonymy for this species which I have not felt it necessary to give here ; it may be found in Munz's paper cited above.

J. P. M. Brenan.

Theaceae

Adinandra greenwayi *Verdcourt*, sp. nov. ; *A. schliebenii* Melch. affinis, sed foliis juvenilibus tomentosis, sepalis extra glabris, antheris apice subapiculatis, stylo basi pilis longis flavidis obtecto differt.

Arbor usque 25 m. alta, sempervirens. *Rami* adscendentes ; internodia usque 1 cm. longa. *Folia* alternata, spiraliter disposita, obovato-elliptica vel oblongo-lanceolata, usque 12 cm. longa et 3·5 cm. lata, basi manifeste cuneata, apice brevissime acuminata, subtus juventute tomentosa, margine sat minute serrata et glandulosa ; acumen obtusum, 0·2 cm. longum et 0·2 mm. latum, haud serratum ; costa supra impressa, subtus prominula ; nervi laterales utrinque circiter 25, supra subtusque prominentes ; venae et venulae prominentes, reticulatae ; petiolus usque 0·5 cm. longus. *Flores* axillares, solitarii ; pedunculi 3 cm. longi, glabri vel tomentosi ; bracteae inaequales. *Calycis segmenta* 5, inaequalia, ovata, acuta, rugosa, ad marginem membranaceam ciliata, extra glabra, intus tomentosa, interiora 2 2·5 cm. longa, exteriora 1·5 cm. longa. *Petala* 5, oblongo-elongata, obtusa, 5 cm. longa et circiter 0·7 cm. lata. *Stylus* 5 cm. longus, basi pilis longis flavidis obtectus. *Ovarium* superius, 5-loculare, ovoideum, pilis flavidis obtectum. *Stamina* 25, filamentis usque 0·5 cm. longis. *Antherae* 0·7 cm. longae, apice subapiculatae.

Tanganyika Territory. Tanga Province, Pare District. S. Pare Mtns., Mtonto, 1980 m., 5 July 1942, *Greenway* 6556 (K, typus) :— locally common on stream-banks in *Ocotea-Podocarpus-Rapanea-Myrica* evergreen forest on steep mountain-slopes ; a much branched evergreen tree with ascending branches up to 25 m. tall ; bark reddish-brown, much fissured in reticulate patches ; flowers large, tubular, creamy-brown with green-tipped petals ; mature leaves with a brownish-cream band each side of the main vein.

The leaves of this species are closely serrate and the serrations are somewhat glandular. The leaves, especially the young ones, have matted rusty-brown hairs beneath particularly on either side of the costa ; they finally however become glabrous. The two basal bracts at the base of the calyx are 8 mm. long and quite rounded. The ovary and base of the style are covered with long buff hairs.

In view of the publication of *Adinandra intermedia* Boutique et Troupin in Bull. Jard. Bot. Brux. **20,** 61–66 (1950), *Greenway* 6556 was sent to Monsieur Troupin for examination. He agrees that it is " une bonne espèce nouvelle ", and has very kindly prepared a table of differences between *A. schliebenii* Melch., *A. intermedia* and *A. greenwayi*, of which the following is a translation :—

	A. schliebenii	A. intermedia	A. greenwayi
Leaves	glabrous	glabrous	pubescent-tomentose
Sepals	inner ones tomentose outside	all glabrous outside	all glabrous outside
Peduncles	glabrous,—4 cm.	glabrous, —3 cm.	sometimes tomentose, —3 cm.
Petals	acute and subentire at apex	obtuse to rounded and slightly denticulate at apex	obtuse to rounded and subentire at apex
Stamens	about 1·5 cm. long	1·2–2·3 cm. long	about 1·2 cm. long
Anthers	connective about 1 mm.	connective 0·7–1·5 mm.	connective not obvious and not prolonged as in the other two species
Style	tomentose	tomentose	pubescent

B. VERDCOURT.

MELASTOMATACEAE

A. THE ACAULOUS SPECIES OF AMPHIBLEMMA

In 1893 Cogniaux described *A. acaule*, which has since remained in apparent isolation, but which must now no longer so continue.

These acaulous species are so different in facies from the rest of *Amphiblemma* that I have toyed with the idea of separating them generically. However, as species both with and without leafy stems, and intermediates, are found in related genera such as *Macrocentrum*, *Bertolonia* and *Gravesia*, I do not consider it justifiable so to split *Amphiblemma* ; to grant sectional rank is, however, another matter :—

Amphiblemma *Naud.* sect. **Amphiblemma***. Plantae caulescentes, folia plus minusve numerosa proferentes. Antherae majores apice plus minusve elongato-attenuatae. Typus : *Amphiblemma cymosum* (Willd.) Naud.

Amphiblemma *Naud.* sect. **Haplophyllophora** *Brenan*, sect. nov. Plantae exiles, acaules, unifoliatae vel raro (a me non visae) bifoliatae. Antherae majores apice breviter angustatae. Typus : *Amphiblemma acaule* Cogn.

Some other African genera, *Cincinnobotrys* Gilg (in Engl. et Prantl, Nat. Pflanzenf., Nachtr. **1,** 265 (1897) ; et in Engl., Monogr. Afr. Pfl.-Fam. u.-Gatt. **2,** 30, t. 6A (1898)) ; *Bourdaria* A. Chev. (in Bull. Mus. Nat. Hist. Nat., ser. 2, **4,** 681, 683 (1932)) ; *Gravesia* Naud. (in Ann. Sci. Nat., ser. 3, **15,** 333 (1851) ; Perrier de la Bâthie in Humbert, Fl. Madagascar **153,** 73 (1951)) ; and a new genus *Primularia* Brenan, described below resemble in habit *Amphiblemma* Sect. *Haplophyllophora*.

*For further subdivisions of sect. Amphiblemma see Pflanzenw. Afr. **3** 2), 756 7 (1921).

These genera are very closely related with each other, and might perhaps be treated as sections of *Gravesia*, which contains species showing similar facies. However *Gravesia*, as treated by Perrier de la Bâthie (*l.c.*), is a large Madagascar genus with anthers rather uniform in structure throughout. The anthers of the related continental African genera show clear differences in structure from those of *Gravesia*, and the latter's homogeneity would be destroyed by their union. The following key to the African genera of the tribe *Sonerileae* should show the relationships.

The African Genera of Sonerileae

Plants with elongate stems bearing pairs of leaves separated by internodes ; stems not enlarged at base, rooting laterally :

Anthers differing markedly in size and structure, the connective of the larger ones appendaged anticously
Amphiblemma Naud. sect. *Amphiblemma*

Anthers equal :

Connective without any anticous appendage, usually spurred posticously *Gravesia* Naud., sens. Perr.

Connective with an anticous appendage appearing as a single scale ; posticous spur absent *Calvoa* Hook. f.

Plants acaulous, the leaves and inflorescences arising directly from the rootstock or a tuber :

Anthers differing markedly in size and structure, the smaller ones unappendaged, the larger ones with a prolonged connective and a single upcurved spur borne anticously ; leaves normally one, rarely two per plant
Amphiblemma Naud. sect. *Haplophyllophora* Brenan

Anthers all similar in structure, sometimes differing in size ; connective not at all or only very shortly prolonged ; anticous appendages if present then paired :

Connective with paired anticous appendages :

Connective with a well-marked downwardly directed posticous spur ; inflorescences all one-flowered . *Bourdaria* A. Chev.

Connective without any posticous spur ; inflorescences two- to several-flowered *Primularia* Brenan, vide infra

Connective without any anticous appendage :

Connective with a thickened ring which is broader posticously and slightly bilobed *Cincinnobotrys* Gilg

Connective without a thickened ring, usually with a single entire posticous spur *Gravesia* Naud., sens. Perr.

Amphiblemma sect. Haplophyllophora

Leaves on both sides with scattered setulose hairs about 0·3–2 mm. long (mostly longer than 0·5 mm.), glabrous between these hairs ; leaves obtusely to subacutely pointed, not acuminate ; larger stamens with filaments 2–3 mm. long, spurs 1·0–1·5 mm. long and anthers 1·5–1·7 mm. long :

Petiole about 10 cm. long ; inflorescence about 10-flowered
1. *A. acaule* Cogn.

Petiole 0·5–1·8 cm. long ; inflorescence 1–3-flowered
1a. *A. acaule* Cogn. var. *brevipes* Brenan

Leaves on both sides with setulose hairs similar to above, but between them with densely and evenly arranged very minute simple hairs less than 0·1 mm. long ; leaves shortly and rather abruptly acuminate at apex ; larger stamens rather smaller than above, filaments 1·5–2 mm. long, spurs 0·5–0·7 mm. long, anthers 1–1·3 mm. long ; petiole 4·5–9·5 cm. long . . . 2. *A. Sereti* (De Wild.) Brenan.

1. **Amphiblemma acaule** *Cogn.* in Bol. Soc. Brot. **11,** 89 (1893) ; Gilg in Engl., Monogr. Afr. Pfl.-Fam. u. -Gatt. **2,** 29 (1898).

Cincinnobotrys acaulis (Cogn.) Gilg in Engl., Pflanzenw. Afr. **3** (**2**), 757 (1921) (in Engl. & Drude, Veg. d. Erde, **9**).

Angola. Lunda District. Calungula region, in damp shady valleys, lat. 7°–8° long. E. 21°, alt. 800 m., 1893, *Sizenando Marques s.n.* (BR, type).

The type-specimen of *A. acaule* consists of but a single plant bearing one leaf. A note accompanying it says " feuilles 1 ou 2 ", but the two-leaved plants still remain unbacked by specimens.

Cogniaux (*l.c.*) gave as the locality "in convallibus territorii, Cobanguli ". I interpret the written label as 'in territories Calungulae' which is probably the same as the place called Kahungula in the Times Atlas, and Caihengula in the Atlas de Portugal Ultramarino (1948).

I disagree with Gilg's transference of this species to *Cincinnobotrys*. The type-specimen shows clearly the very dissimilar anthers, which are wrong for *Cincinnobotrys*. Although on p. 743 of vol. **3** (**2**) of the Pflanzenwelt Afrikas Gilg keys out *Cincinnobotrys* by its very unequal anthers, this applies only to *C. acaulis*, i.e. *Amphiblemma acaule*, and not to the type of *Cincinnobotrys*, *C. oreophila*, as a glance at t. 318 E on p. 758 of the same work shows. Incidentally, the distinction between the 5-merous flowers of *Amphiblemma* and the 4-merous ones of *Cincinnobotrys*, used by Gilg in the same key, does not work, as both sorts occur together in the type-specimen of *Amphiblemma acaule* var. *brevipes*.

1a. **Amphiblemma acaule** *Cogn.* var. **brevipes** *Brenan*, var. nov., a typo petiolo multo breviori tantum 0·5–1·8 cm. longo differt.

Herba e rhizomate brevi tuberoso usque ad circiter 1 cm. longo pilis densis siccitate cupreis vestito nascens. Folia solitaria, plantarum floriferarum magnitudine variabilia, 3–7 cm. longa, 2–6·5 cm. lata. Pedunculi 3–7 cm. alti, squamis paucis minimis praediti. Inflorescentiae 1–3-florae.

Northern Rhodesia. Mwinilunga District. Luakera Falls, N. of Mwinilunga, on damp mossy rocks in shade of evergreen vegetation, 25 Jan. 1938, *Milne-Redhead* 4348 (K, typus varietatis) :—perennial with small tuber ; leaves single, green, rather rugose, pinkish below ; stem and calyx pinkish ; petals pale pink ; larger stamens 5 : filaments white ; anthers yellow ; projecting connective crimson.

The range of variation in normal *A. acaule* is still unknown, so that it remains to be seen whether the striking difference in petiole length between the species and the variety is constant. The inflorescence in typical *A. acaule* is about 10-flowered, in the variety 1–3-flowered, but this difference too must remain *sub judice* until more material has been collected.

2. **Amphiblemma sereti** (*De Wild.*) *Brenan*, comb. nov.

Cincinnobotrys sereti De Wild., Études Fl. Bas- et Moyen-Congo, **2,** 330, t. 89 (1908) (in Ann. Mus. Congo, Bot. Ser. 5, 2).

Belgian Congo. District de l'Ubangi-Uele. Route from Runga to Poko, 24 Aug. 1906, *Seret* 645 (BR,typus) :—white-flowered plant growing in shade on river-bank.

This plant was described as a *Cincinnobotrys*, but the staminal structure is altogether that of *Amphiblemma acaule*. The differences, for which see the key, are mostly vegetative and not very great, and it is quite possible that *A. sereti* may be no more than a variety of *A. acaule*. As none of the three groups dealt with in this note has been collected more than once, I think it better to leave *Amphiblemma sereti* as a species.

It is noteworthy that the locality of *A. sereti* is in the north-east of the Belgian Congo, far distant from those of *A. acaule* and its variety.

Finally, grateful acknowledgement must be made to the Director of the Jardin Botanique de l'État, Brussels, through whose courtesy the types of *Amphiblemma acaule* and *Cincinnobotrys sereti* have been examined.

J. P. M. Brenan.

B. Primularia

Primularia *Brenan*, gen. nov. e trib. *Sonerilearum*, *Bourdaria* A. Chev. affinis, inflorescentiis paucifloris, connectivo antherarum postice exappendiculato differt.

Herba acaulis. Folia solitaria vel pauca, omnia basalia. Inflorescentiae umbelliformes, paucifloraе. Flores tetrameri vel pentameri. Calyx late cupulatus, denticulato-subtruncatus. Stamina 8–10, aequalia; connectivum brevissime productum, antice bicalcaratum, postice exappendiculatum ; antherae apicem versus uniporosae. Ovarium fere usque ad apicem cum tubo calycis connatum, apice annulo epigyno glanduloso-ciliolato coronatum, 4–5-loculare. Semina minima, obovoideo-cuneata, recta.

Primularia pulchella *Brenan*, sp. nov. adhuc unica.

Herba pumila, 6–9 cm. alta. *Folia* usque ad 3, breviter petiolata ; petiolus 5–11 mm. longus, pilis flexuosis sparse indutus ; lamina late ovata, tenuis, apice plerumque obtusa nonnunquam subacuta haud acuminata, basi cordata, 0·7–2·8 cm. longa, 0·5–2·4 cm. lata, utrinque sed praesertim supra pilis flexuosis usque ad 1·5 mm. longis laxe induta, supra siccitate viridia, subtus pallidiora et nervis 7–9 prominulis palmatim divergentibus percursa, margine subintegra vel minute denticulata, breviter ciliata. *Scapus* nudus, 4–6 cm. altus, pallidus, sparse pilosus.

Inflorescentiae 2–6-florae ; pedicelli 9–13 mm. longi, pilis patentibus flexuosis minute capitato-glandulosis necnon aliis minimis furfuraceis commixtis sparse pubescentes, basi bracteis minimis lanceolatis usque ad 1·5 mm. longis. *Flores* rosei. *Calyx* 2·5 mm. longus, circiter 3 mm. latus, minute 4- vel 5-denticulatus, more pedicellorum sed paulum densius vestitus, margine glanduloso-ciliolatus. *Petala* 4–5, paulum oblique obovata, 7 mm. longa, 6 mm. lata, apice late rotundata et ibi medio pilo unico brevi glandulifero praedita. *Stamina* lutea ; filamenta arcuata, 2·5 mm. longa, antice brevissime glanduloso-pilosa ; connectivum per 0·3 mm. productum, calcaribus anticis 0·3 mm. longis semiovatis erosis ; antherae oblongae, 1·5 mm. longae, 0·5 mm. latae. *Stylus* 3 mm. longus, apicem versus arcuatus et incrassatus, sparse ac brevissime glandulosus ; stigma capitatum. *Calyx fructiferus* parum accrescens. *Semina* pallida, 0·3 mm. longa, 0·25 mm. lata.

Tanganyika Territory. Southern Province, Lindi District. Rondo Plateau, herb on mossy bank of scarp-face below Mchinjiri, Feb. 1951, *Eggeling* 6041 (K, typus) :—flowers pink, decorative, recalling a primula.

The relationship of *Primularia* to the other African genera of the tribe *Sonerileae* is given by the key on p. 86.

J. P. M. Brenan.

Sterculiaceae

Mansonia diatomanthera *Brenan* in Hook. Ic. Pl. t. 3451 (1947).

Since this very interesting species was described fruiting material has been collected in the type locality by the original collector. This material is in mature fruit and since no description of the fruit could be given in the original description it was thought that this additional information would be of some interest.



Fig. 1. Fruit of *Mansonia diatomanthera* Brenan. Centre : fruit with two samaras ; left : seed (wrinkled when drawn, shape somewhat reconstructed) ; right : base of samara opened to show seed *in situ*. All ¾ natural size.

Only one or two carpels seem to mature. The fruit is a collection of samaras as shown by Prain for *M. gagei* Drumm. ex Prain. Each samara measures to 6·5–7 cm. long by 2–2·7 cm. wide (at the widest part of the

wing). The veins of the wing are slightly raised and irregularly reticulate. The wing is fairly densely covered with rather deciduous stellate hairs similar to those occurring on the calyx. The nut-containing portion of the samara is ovoid 1·7–1 cm. long and about 1 cm. thick. This ovoid portion is covered with tubercular projections densely covered with brown stellate pubescence. The walls of this portion are woody and just over 1 mm. thick. The seed is lobed but undoubtedly due to drying contractions. It is finely and closely striate longitudinally and transversely crosshatched. Minute golden gland-like dots cover the surface. In this mature material the leaves are up to 18 × 17 cm., subcoriaceous, shallowly crenate, rather smooth and glabrescent above, raised veins reticulate and stellately pubescent below. Unfortunately the seeds are too young to show the structure of the embryo, particularly the cotyledons.

Tanganyika Territory. Tanga Province, Handeni District. 15 Feb. 1948, *Yusuf Mohamed* AH. 9877 (EA) :—growing in forest and also in native cultivations ; flowers yellow ; tree up to 15 m. high with much branched crown ; bark used for scabies ; the bark is steeped in cold water for half an hour ; the liquid is bathed in three times a day and is said to be a quick cure : vernacular name (Kizigua) " Mbentampunda".

Miss D. R. Thompson has kindly illustrated the fruit.

B. Verdcourt.

Malvaceae

Abutilon grandifolium (*Willd.*) *Sweet*, Hort. Brit., ed. 1, 53 (1826).

Sida mollis Ort., Hort. Matr. Dec. 65 (1797), non L. C. Rich. in Act. Soc. Hist. Nat. Paris, **1,** 111 (1792).

Sida grandifolia Willd., Enum. Pl. Hort. Berol. 724 (1809) ; Ker-Gawler in Bot. Reg. t. 360 (1819).

Abutilon tortuosum Guill. et Perr. in Guill., Perr. & A. Rich., Fl. Seneg. Tent. 68 (1831) ; Hutch. & Dalz., Fl. W. Trop. Afr. 1, 261 (1828).

[*Abutilon mollissimum* (non (Cav.) Sweet)—auct., e.g. Exell, Cat. Pl. S. Tomé, 117 (1944)].

Senegal. " Plante introduite au Sénégal ", *Roger in Herb. Gay s.n.*

S. Tomé. Rodia, 450 m., Dec. 1887, *Quintas* 30.

Portuguese East Africa. Sul do Save Province. Lourenço Marques, Experimental Garden, cultivated, 28 Mar. 1947, *Cabral & Pedrogão* 165.

Zululand. Richards Bay, 26 Aug. 1937, *J. Gerstner* 2803.

Natal. Maritzburg and Durban, 10 Feb. 1920, *Natal Herb. No.* 16410 :—flowers yellow.

South Africa. Umtata, Sept., 1922, *A. Bowker* 2584 :—flowers yellow.

A. grandifolium is a native of South America, and there is synonymy in the floras of that region additional to what is given above. From S. America it has been introduced into various parts of the world—Africa, India, Madeira. The statement in Fl. W. Trop. Afr. that it is common in the Eastern Tropics is wrong, based on the idea that *A. graveolens*

(Roxb. ex Hornem.) Wight et Arn. was a synonym of *A. tortuosum* (i.e. *A. grandifolium*). *A. graveolens* is in fact a distinct species and a synonym of *A. hirtum* (Lam.) Sweet. True *A. grandifolium* does occur in India, and there are several old sheets of it at Kew (e.g. Gurwhal, *Falconer in Herb. E. India Company No.* 274). In India it has been usually called *A. graveolens* var. *hirtum* (Lam.) Mast., a misidentification.

The name *Abutilon mollissimum* (Cav.) Sweet has been used for *A. grandifolium*, but Cavanilles refers to a Peruvian plant with *long capillary stipules*, clearly I think, not *A. grandifolium*.

I am grateful to the authorities of the Botanic Garden at Berlin-Dahlem for the loan of the two splendid original sheets of Willdenow's *Sida grandifolia*.

J. P. M. Brenan.

Euphorbiaceae

Phyllanthus trichotepalus *Brenan*, sp. nov. ; a *P. odontadenio* Muell. Arg. et *P. leucantho* Pax, quibus affinis, caulibus foliis pedicellis tepalis pubescentibus, foliis majoribus, floribus foemineis plerumque fasciculatis, pedicellis fructiferis longioribus differt ; *P. taitensi* Hutch. etiam affinis, habitu herbaceo nec fruticoso, indumento, pedicellis brevioribus fructiferis apicem versus haud incrassatis, sepalis fructiferis minus accrescentibus, stylis minus erectis differt.

Herba ut videtur annua, erecta, 45–90 cm. alta, caulibus 1–3 mm. diametro, viridibus vel plus minusve purpurascentibus subteretibus vel leviter angulatis ramos floriferos patentes 4–15 cm. longos leviter ancipites sub nodis aliquantum dilatatos emittentibus ; caules, petioli, stipulae, foliorum ambae paginae, pedicelli, tepala extrinsecus molliter ac breviter sed satis dense pubescentes. *Folia* obovato-oblonga vel -elliptica, (1·3–) 1·5–3·6 cm. longa, (0·6–) 0·9–1·9 cm. lata, tenuia, apice rotundata vel abrupte acuta, basi rotundata, supra laete viridia, subtus glauco-viridia nonnunquam purpurascentia, costa nervisque lateralibus utrinque 6–8 supra leviter impressis vel siccitate inconspicuis subtus prominulis ; stipulae lineari-filiformes, 2–3 mm. longae. *Flores* monoeci, masculi minimi ex axillis rami infimis circiter quaterni fasciculati, foeminei majores ex axillis mediis et superioribus singuli vel saepius usque ad quaterni exorientes. *Flores masculi* brevissime (usque ad 1·5 mm.) pedicellati ; tepala 6, 3 exteriora breviter obovato-elliptica, apice obtuse ac brevissime mucronata, 3 interiora breviter oblongo-elliptica, obtusa vel subacuta, omnia 1·5 mm. longa, 0·7–0·8 mm. lata, nervo medio viridi excepto hyalina ; disci glandulae 6, liberae, papillis circiter 11–12 ornatae; stamina 3, filamentis in columellam circiter 0·5 mm. altam connatis, antheris apice fere sessilibus circiter 0·5 mm. altis, thecis rima exacte longitudinali dehiscentibus. *Flores foeminei* 1–2 mm. longe pedicellati ; tepala 6, 3 exteriora ovata, apice obtuse angustata, 3 interiora oblonga, obtusa, omnia 1·8 mm. longa, 1 mm. lata, nervo medio viridi excepto hyalina ; discus brevissime 6-dentatus etiam minutissime crenulatus ; ovarium subglobosum, brevissime stipitatum, circiter 0·8 mm. diametro, lobis laevibus haud papillosis ; styli 0·5 mm. longi, liberi, a basi erecto-patentes, apice brevissime bifidi, lobis circiter 0·1 mm. longis. *Fructus* pedicellis usque ad 3 mm. longis suffulti, tepalis persistentibus paullum

accrescentibus tunc 2 2·5 mm. longis 1·1–1·5 mm. latis medio viridibus late albo-marginatis ; capsula circiter 2–2·2 mm. diametro, trilobata, laevis, brunnea. *Semina* pallide brunnea, dorso lineis tenuibus longitudinalibus 6–7 notata.

Uganda. Western Province, Kigezi District. Ishasha Gorge, Kigezi, alt. 1500 m., May 1950, *Purseglove* 3403 (K, typus) :—erect herb to 1 m. high with pale green flowers ; on forest-edge. Also living plants cultivated in Hort. Kew from seed of last number. Buganda Province, Mengo District. Forest, Kirerema, Sept. 1914, *Dümmer* 267 :—to 60 cm. ; flowers creamy-green. Kampala Plantation, alt. 1330 m., Feb. 1935, *Chandler* 1175 :—roadside in area after cultivation ; 60 cm. high ; leaves green, immature reddish, also stipules and junction of lateral branches with main stem ; stems green covered with short hairs ; flowers greenish. Kawanda near Kampala, alt. 1330 m., Apr. 1936, *Chandler* 1603 :—edge of swampy area ; height 45 cm. or more ; flowers greenish.

The most unusual thing about this species is the pubescence, which extends even to the outside of the tepals.

I am most grateful to Mr. H. C. Dawkins of the Uganda Forest Department for telling me exactly where Dümmer's locality Kirerema is.

J. P. M. Brenan.

Drypetes fernandopoana *Brenan*, nom. nov.

Cyclostemon glomeratus Muell Arg. in Flora **47,** 532 (1864) ; et in DC., Prod. **15** (**2**), 485 (1866) ; Pax in Engl., Bot. Jahrb. **33,** 278 (1903).

Drypetes glomerata (Muell. Arg.) Hutch. in Thiselton-Dyer, Fl. Trop. Afr. **6** (**1**), 679 (1912) ; Pax in Engl., Pflanzenr. **4, 147, 15,** 242 (1922) ; non *Drypetes glomerata* Griseb. in Abh. Gesellsch. Goettingen **7,** 172 (1857).

I must thank my colleague Mr. N. Y. Sandwith for pointing out that *Drypetes glomerata* (Muell. Arg.) Hutch. is a later homonym and illegitimate. I know of no other synonymous epithet for the latter, so that a new name is wanted.

J. P. M. Brenan.

Drypetes diopa (*Hiern*) *Brenan*, comb. nov.

Diospyros diopa Hiern in Journ. Bot. **59,** 129 (1921) ; Greves in Journ. Bot. **67,** suppl. 2, 77 (1929).

Hiern wrote that the " prominently embracing bract " and the 2-celled ovary were the distinguishing characters of *Diospyros diopa*, transforming presumably the foliaceous stipules into a bract. The 2-celled ovary would certainly be very anomalous in *Diospyros*, where it is normally 4–16-celled, and the biovulate loculi would also be most unusual.

Unfortunately Hiern, and Greves after him, missed the most obvious clue that would have enabled them to reconcile the apparent anomalies—the serrulate leaves ; these are clearly shown on the type-specimen in the British Museum Herbarium (Hiern's description of the leaves as "integris" is thus wrong), and also on the sheets of *Gossweiler* 7634 at Kew ; a genuine *Diospyros* with such leaves would surely be unique. However

these leaves with their oblique base, the stipules, the ovary structure, the ovule number and above all the general facies are altogether similar to those of some species of *Drypetes* in *Euphorbiaceae*.

In *Drypetes D. diopa* finds its closest affinity with *D. gilgiana* (Pax) Pax et K. Hoffm., but I consider that it should be kept as a distinct species on account of the subsessile flowers on pedicels only about 1 mm. long, and of the cuneate-based leaves, the actual base being neither obtuse nor minutely cordate as in *D. gilgiana*.

According to Hutchinson's concept in the Flora of Tropical Africa, **6** (**1**), and in the Flora of W. Tropical Africa, *Drypetes diopa* would no doubt be a *Lingelsheimia*, but I prefer to follow Pax and K. Hoffmann's idea of the latter genus as expressed in Das Pflanzenreich. To use the degree of lobing on the disc as a generic character results in otherwise unrelated species being grouped into *Lingelsheimia*.

A diagnosis of *Drypetes diopa* follows :

Drypetes diopa (Hiern) Brenan ; a *D. gilgiana* (Pax) Pax et K. Hoffm. floribus subsessilibus pedicellis circiter 1 mm. longis, foliis basi cuneatis basi ipsa nec obtusa nec minute cordata differt.

J. P. M. Brenan.

Leguminosae

Sesbania sesban (L.) Merr. var. **bicolor** (*Wight*) *F. W. Andr.*, comb. nov.

Sesbania aegyptiaca var. *bicolor* Wight [Cat. Pl. 55, n. 906 (1833), *nomen nudum* et] in Wight & Arn., Prodr. Fl. Penins. Ind. Or. **1,** 214 (1834) ; Phillips & Hutch. in Bothalia **1,** 45 (1921) ; Hutch. & Dalz., Fl. W. Trop. Afr. **1,** 387 (1928) ; Bak. f., Leg. Trop. Afr. **2,** 259 (1929) ; Broun & Massey, Fl. Sudan, 192 (1929).

Sesbania atropurpurea Taub. in Engl., Bot. Jahrb. **23,** 188 (1896).

F. W. Andrews.

Aeschynomene (sect. *Ochopodium* Vogel) **inyangensis** *H. Wild*, sp. nov. ; verisimiliter affinis *Aeschynomene gazensi* Bak. f. sed foliis et petiolis ad vestigium lineare reductis.

Frutex ramosus ad 1 m. altus. *Ramuli* setuloso-glandulosi, cortice griseo-brunneolo. *Stipulae* coriaceae, congestae (internodiis 1–2 mm. longis), basifixae, ovatae vel ovato-lanceolatae, leviter convolutae, cuspidatae, 2·5–5 mm. longae, 1–1·5 mm. latae, margine hyalino, leviter et minute setuloso, nervis 4–7 in superficie adaxiale vix prominentibus in superficie abaxiale prominentibus longitudinalibus hyalinis, inter nervos minute pellucido-punctatae. *Folia* et *petioli* ad vestigium minutum lineare reducti ; vestigium in ramulis senioribus plerumque caducum, cuspidatum, minute pellucido-punctatum, 2–4·5 mm. longum, 0·5–0·75 mm. latum, margine hyalino ad apicem minute et pauce setuloso, nervis 1–3 hyalinis. *Racemi* axillares, laxi, 1–3-flori ; pedicelli graciles, setuloso-glandulosi, ca. 2–3 mm. longi ; bracteolae 2, oppositae, ad pedicelli apicem insertae, ovatae, acutae, nervis 6–7 longitudinalibus, 3 mm. longae, 1·5 mm. latae, cum bracteis margine laevi vel setuloso-ciliato. *Flores* mediocres, glabri, flavi, cum nervis brunneis. *Calyx*

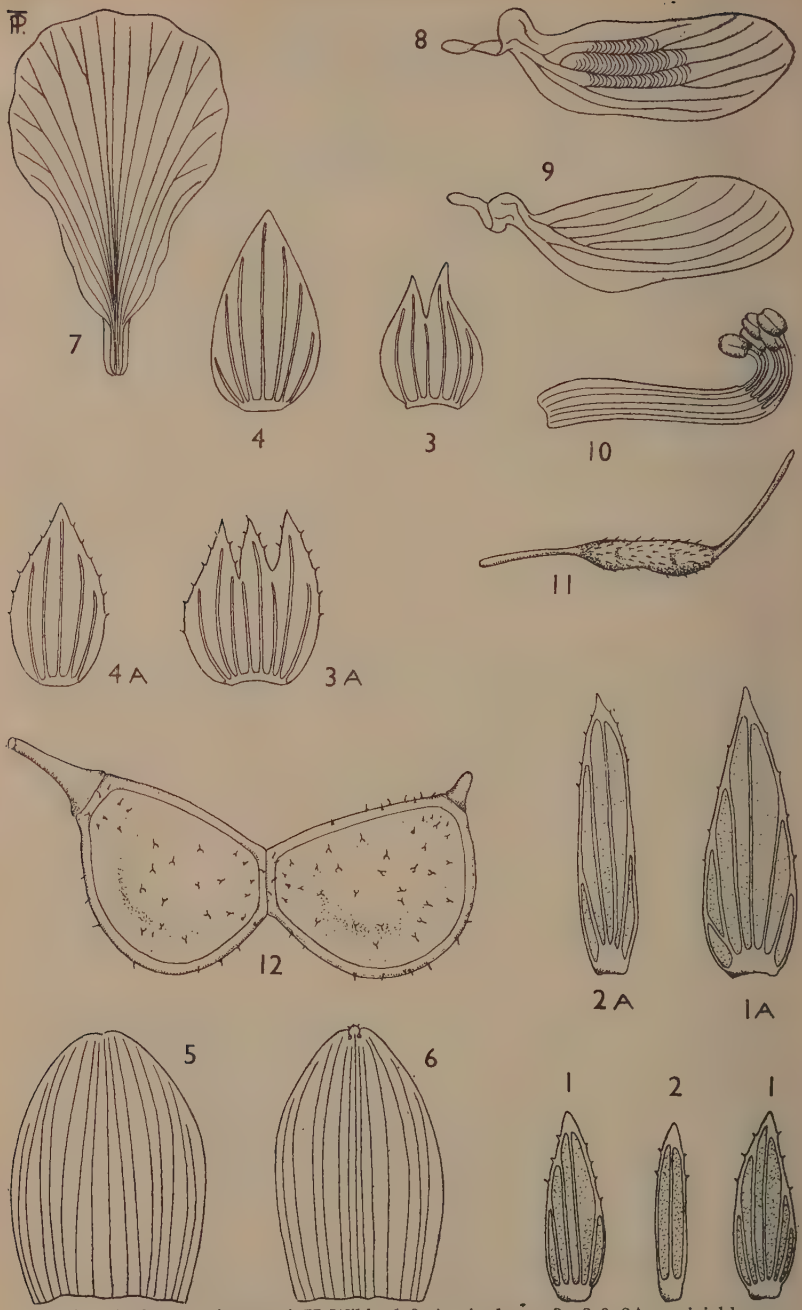


FIG. 2. *Aeschynomene inyangensis* H. Wild—1 & A, stipules, × 9; 2 & 2A, vestigial leaves, × 9 ; 3 & 3A, bracts, × 9 ; 4 & 4A, bracteoles, × 9 ; 5, upper lip of calyx, × 9 ; 6, lower lip of calyx, × 9 ; 7, standard, × 6 ; 8, wing, × 6 ; 9, keel, × 6; 10, staminal tube divided longitudinally, × 6 ; 11, ovary, × 6 ; 12, fruit, × 6. (1-12 from S.R.G.H. 15974 ; 1A & 2A from S.R.G.H. 22819 ; 3A & 4A from S.R.G.H. 19291).

membranaceus, bilabiatus, glaber, labio superiore ovato acuto 6 mm. longo 5 mm. lato 11-nervi, labio inferiore ovato-oblongo apice minute tridentato basi leviter gibboso, 6 mm. longo, 4 mm. lato, nervis 15–17. *Corolla* : vexillum obovatum, basi cuneatum, unguiculatum, 11 mm. longum, 8 mm. latum, nervis 15–17 ; alae oblongae, apice obtusae, basi unguiculatae, medio rugosae, 9–10 mm. longae, 3 mm. latae, nervis 10 ; carina oblonga, obtusa, basi unguiculata, usque 9-nervis, 10 mm. longa, 4 mm. lata. *Stamina* monadelpha, in toto 9 mm. longa, filamentis glabris usque 1·5 mm. longis, antheris oblongis flavis. *Ovarium* biovulatum, stipitatum (2·5 mm.), setuloso-ciliatum, stylo glabro tenui 2·5 mm. longo. *Legumen* stipitatum, biarticulatum, rarius uniarticulatum, suturis incrassatis, articulis compressis sparse setulosis brunneis margine incrassatis usque 5 mm. longis, 4 mm. latis.

Southern Rhodesia. Inyanga, Pungwe Source, 1900 m., 20 Oct. 1946, *H. Wild* 1432 (S.R.G.H. No. 15974) SGH, typus, K, isotypus) :— 1 m. bush in open grassland by stream, flowers yellow. Inyanga, banks of Pungwe R. 1800 m., 24 Oct. 1946, *J. M. Rattray* 1016 (S.R.G.H. No. 19291) :—yellow-flowered shrub, common. Inyanga, Mt. Inyangani 2100 m., 25 Oct. 1946, *J. C. Hopkins* in S.R.G.H. No. 17168 :—1·2 m. shrub, flower yellow with fine brown lines. Inyanga, Pungwe R. above falls, 1800 m., July 1948, *Fisher & Schweickerdt* 299 (S.R.G.H. No. 22819) :—dwarf branched suffruticose herb on stream-bank, flowers yellow. Inyanga, Mt. Inyangani, c. 2500 m., 7 Dec. 1930, *Fries, Norlindh & Weimarck* 3565 (K, LD) :—in mountain scrub ; shrub 0·5 m. high.

Portuguese East Africa. Manica e Sofala Province. Vila Gouveia, 1300 m., 7 Sept. 1943, *Torre* 5849 : (LISBON, Herb. Junta de Investigações Coloniais) :—shrub 0·5 m. high ; flowers yellow ; savannahs on the slopes of the Serra de Choa.

This species was first sent to Kew from S. Rhodesia in 1947 and Mr. E. Milne-Redhead, who was good enough to examine it at the time, remarked that he knew of no members of this genus with their leaves reduced in this way. For this reason it is difficult to assign its affinities. Nevertheless, in general appearance and flower and fruit characters it closely resembles *Aeschynomene gazensis* Bak. f. It is found only in the high altitude and high rainfall areas of the Inyanga district, and its heath-like habit is very reminiscent of the *Erica*, *Stoebe* and *Cliffortia* spp. which are so characteristic of the flora of this region.

H. Wild.

Aeschynomene (sect. *Ochopodium* Vogel) **aphylla** *H. Wild*, sp. nov. ; affinis *Aeschnomene inyangensi* H. Wild sed folio et petiolo ad squamam minimam simplicem reductis, stipulis majoribus lanceolatis plurinervibus densissime setulosis, leguminis articulis reticulatis differt.

Frutex ramosus, ad 1 m. altus. *Ramuli* virgati, setuloso-glandulosi, cortice griseo-brunneolo. *Stipulae* coriaceae, congestae (internodiis 1–2 mm. longis), basifixae, lanceolatae, leviter convolutae, cuspidatae, 6–13 mm. longae, 1·5–2 mm. latae, margine hyalino densissime setuloso, nervis 11–13 in superficie adaxiale vix prominentibus in superficie abaxiale prominentibus longitudinalibus hyalinis, inter nervos minute pellucido-punctatae. *Folia* et *petioli* ad squamas brunneas vestigiales

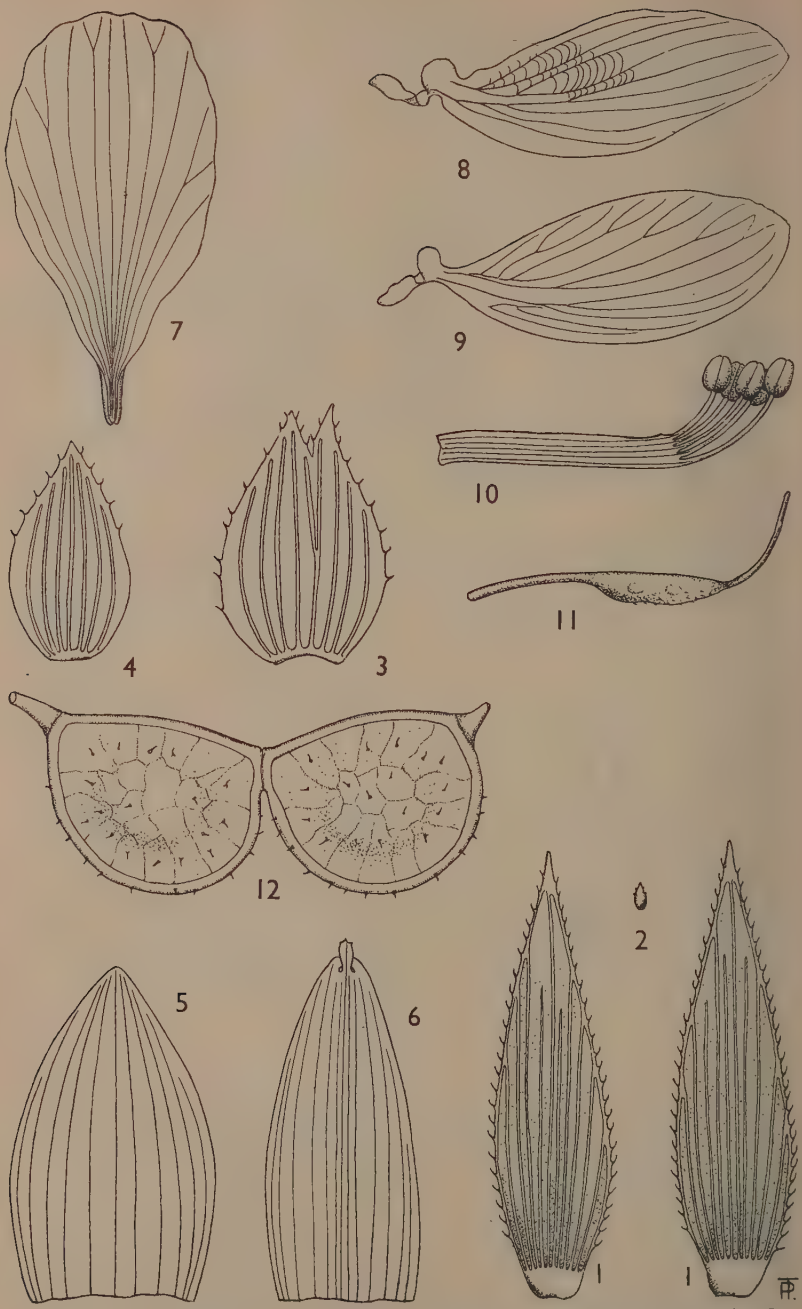


FIG. 3. *Aeschynomene aphylla* H. Wild—1, 1, stipules, × 9 ; 2, vestigial leaf, × 9 ; 3, bract, × 9 ; 4, bracteole, × 9 ; 5, upper lip of calyx, × 9 ; 6, lower lip of calyx, × 9 ; 7, standard, × 6 ; 8, wing, × 6 ; 9, keel, × 6 ; 10, staminal tube divided longitudinally, × 6 ; 11, ovary × 6 ; 12, fruit, × 6. (All from S.R.G.H. 23622).

simplices 0·3–0·5 mm. longas reducta. *Racemi* axillares, laxi, 1–4-flori ; pedicelli graciles, setuloso-glandulosi, 3–4 mm. longi ; bracteolae 2, oppositae, ad pedicelli apicem insertae, ovato-acuminatae, ad apicem minute sparsissime ciliato-setulosae, 3 mm. longae, 1·5 mm. latae, nervis 7–9, longitudinalibus. *Flores* mediocres, flavi, glabri, cum nervis brunneis. *Calyx* bilabiatus, membranaceus, glaber, labio superiore oblongo-ovato obtuso 7–9 nervi 5 mm. longo, 4 mm. lato, labio inferiore oblongo obtuso apice minute tridentato basi leviter gibboso 7–9 nervi 5 mm. longo 4 mm. lato. *Corolla* : vexillum oblongo-obovatum, apice obtusum, basi cuneatum, leviter unguiculatum, 9 mm. longum, 5–6 mm. latum, nervis 9–11 ; alae oblongae, apice obtusae, basi unguiculatae, medio rugosae, usque 9 mm. longae, 3–5 mm. latae, nervis 7–9 ; carina oblonga, apice obtusa, basi unguiculata, 9 mm. longa, 3–5 mm. lata, nervis 7–9. *Stamina* monadelpha, in toto 8 mm. longa, filamentis glabris 1–1·5 mm. longis, antheris flavis oblongis. *Ovarium* stipitatum (3 mm.), biovulatum, sparsissime setuloso-ciliatum, stylo glabro tenui 2 mm. longo. *Legumen* stipitatum, biarticulatum, rarius uniarticulatum, suturis incrassatis, articulis compressis leviter reticulatis sparsissime setulosis brunneis margine incrassatis usque 4 mm. longis 3 mm. latis.

Southern Rhodesia. Chimanimani Mts., 1800 m., 6 June 1949, *H. Wild* 2873 (S.R.G.H. No. 23622) (SGH, typus, K, isotypus) :— 60 cm. shrub by stream, flowers yellow.

Portuguese East Africa. Chimanimani Mts., 1800 m., 6 June 1949, *H. Wild* 2889 (S.R.G.H. No. 23592) :—1 m. bush by stream, flowers yellow.

This species is very closely related to *Aeschynomene inyangensis* but is readily distinguished by the longer lanceolate stipules, with their densely setulose margins, and the reticulate legume. It is also remarkable for the even greater reduction of the vestigial leaf to a mere scale less than 0·5 mm. in length. This has no visible elaboration of structure but its origin is nevertheless recognisable as it bears a bud in its axil. The type locality is very similar ecologically to that of *Aeschynomene inyangensis*, and heath-like shrubs are very common. Although the two gatherings quoted are from different territories they were only two miles away from each other. The international boundary runs between the two localities.

H. Wild

Acacia asak (*Forsk.*) *Willd.*, Sp. Pl. **4,** 1077 (1806), non auct. al., quae = *A. hamulosa* Benth. ; C. Christensen in Dansk Bot. Arkiv, **4** (**3**), 29 (1922), excl. syn. *A. hamulosa* Benth.

Mimosa asak Forsk., Fl. Aegypt.-Arab. 176 (1775) ; Vahl, Symb. Bot. **2,** 104 (1791).

Acacia glaucophylla Steud. ex A. Rich., Tent. Fl. Abyss. **1,** 243 (1847) ; Schweinf. in Linnaea, **35,** 372, t. 22b (1867–8) ; Oliv. in Fl. Trop. Afr. **2,** 342 (1871) ; Benth. in Trans. Linn. Soc. **30,** 516 (1875) ; Schweinf. in Bull. Herb. Boiss. **4,** app. 2, 217 (1896) ; Fiori in Agric. Colon. **5,** 92 (1911) ; Harms in Engl., Pflanzenw. Afr. **3** (**1**) (Engler & Drude, Veg. Erde, 9), 381 (1915) ; Blatter, Fl. Arabica, **2,** 185 (1921), excl. syn. *Mimosa stellata* et *Acacia stellata* ; Bak. f., Leg. Trop. Afr. 827 (1930) ; O. Schwarz in Mitteil. Inst. allg. Bot. Hamburg **10,** 84 (1939).

Acacia triacantha Hochst. ex A. Rich., Tent. Fl. Abyss. **1,** 244 (1847).

Among the types of Forskål that I have, through the courtesy of the authorities of the Botanical Museum of the University of Copenhagen, been enabled to examine is that of *Mimosa asak*.

Forskål's type is a poor one. It shows very dark blackish-plum-coloured twigs, puberulous when young then glabrescent ; ternate infrastipular prickles ; leaves with puberulous unarmed rhachides or sometimes with up to two prickles ; 2–3-jugate pinnae also with unarmed rhachides ; 4–6 pairs of leaflets on upper pinnae, variable in size, 3 × 1·5 to 9 × 4 mm., mostly more than 2 mm. wide, rounded at apex and glaucescent beneath. Flowers and fruits both are lacking.

In foliage it resembles *Bent* 157 (Dhofar, SE. Arabia) and *Trott* 1417 (80 miles NNE. of Jedda, Arabia) (both in the Kew Herbarium), except that the latter has glabrous foliage ; I do not consider this significant, since finely pubescent foliage can readily be found among African and Arabian specimens of *A. asak*.

The relationship of *A. asak* to *A. senegal* is still not altogether clear, but I consider it best still to maintain it as a species.

J. P. M. Brenan.

Acacia senegal (*L.*) *Willd.* var. **leiorhachis** *Brenan*, var. nov. ; a planta normali rhachide inflorescentiae glandulis exceptis glabro vel fere glabro differt.

Kenya. Central Province, Kitui District. Yatta Plateau, alt. 610 m., Aug. 1937, *H. M. Gardner* 3694 :—tree to 7·5 m. tall ; pods 10 × 2·5 cm. Machakos District. Makindu, Feb. 1905, *A. Linton* 108. Central or Masai Province? Kima, 2 Mar. 1930, *E. R. Napier* 17 :—4·5–6 m. high ; bark grey and brown papery ; no thorns on main branches ; flowers borne on primary as well as secondary branches, cream-coloured to white, in spikes 5–10 cm. long, very sweetly scented. Masai Province. Ngong Hills, new Magadi road, alt. 1650 m., Dec. 1938, *Bally* 8467 :—shrub 2·4 m. high, in dry bush-country.

Tanganyika Territory. Tanga Province, Pare District. Near Same, alt. 1070 m., 7 Feb. 1930, *Greenway* 2192 (K, typus varietatis) :—forming one of the dominant trees in *Acacia* Desert Grass country ; small bushy tree up to 6 m. tall with pale yellow flowers and flat pods. Lushoto District. Usambaras, *Holst* 3167, 3870. Tanga District. Tangata, 29 July 1915, *Zimmermann* A.1 :—tree. Handeni District. On the way to Old Loskitu from Kibuasch, alt. 760–910 m., 18 Sept. 1933, *Burtt* 4910. Central Province, Mpwapwa District. Mpwapwa, 2 June 1929, *Mrs. Hornby* 140 ; widespread tree, flowering when leafless, and then standing out conspicuously. Mpwapwa and Gulwe, 26 Apr. 1932, *Burtt* 3845. Province doubtful. Without locality, *Busse* 394.

? Northern Rhodesia. Victoria Falls, April 1906, *C. E. F. Allen* 399 :—a straggling tree 3–4·5 m. high.

Transvaal. Zoutpansberg District. Messina, alt. 610 m., Sept. 1908, *C. E. Legat* (53) 4910 [both numbers on the same label]. Dongola Reserve, Reidel Farm, 15 Mar. 1948, *Verdoorn* 2266 :—tall, bark peeling ; mostly tree-shape with slender reaching arms ; 3 spines. Dongola Reserve, Hartjiesfontein, Saker's Homestead, just beyond reservoir, 16

Mar. 1948, *Verdoorn* 2294 :—more bushy than typical, about 3 m. tall ; pods stipitate, not rostrate. Same locality, 16 Mar. 1948, *Verdoorn* 2293 :—in mopane-acacia veldt ; bark dark grey-brown, peeling occasionally in flakes, leaving white patches ; tall shrubby growth with branches reaching and rather open. 3½ miles SE. of P.O. Vivo, alt. 850 m., 26 Apr. 1948, *L. E. Codd* 4049 :—in thornveldt on brown loam flats with limestone concretions, locally common ; slender, erect, 4·5 m. high, with yellow peeling bark. District doubtful. Malelane, Aug. 1917, *Pole-Evans* H. 15768.

The new variety seems to be separable from normal *A. senegal* (L.) Willd. solely by the character of the glabrous or subglabrous, not ± densely pubescent, inflorescence-rhachis ; and intermediates occur with slightly hairy rhachides. The variety is not distributed at random, and appears to be confined to East and South Africa. In East Africa it occurs together with normal plants with pubescent rhachides ; but in the Transvaal normal *A. senegal* appears to be absent, and the plants with pubescent rhachides belong to another distinct variety, which is discussed below.

J. P. M. Brenan.

Acacia senegal (*L.*) *Willd.* var. **rostrata** *Brenan*, var. nov. ; a *A. senegal* normali leguminibus apice manifeste rostratis vel acuminatis differt, et verisimiliter habitu fruticoso vel arbusculo vertice denso complanato vel supra leviter convexo differt ; a var. *leiorhachide* Brenan habitu (ut supra) et rhachide inflorescentiae plus minusve dense pubescenti recedit.

A. spinosa Marl. et Engl. in Engl., Bot. Jahrb. **10,** 20 (1888), non E. Mey. in Comm. Pl. Afr. Austr. **1,** 170 (1836).

A. trispinosa " Marl. et Engl. " ex Schinz in Mém. Herb. Boiss. **1,** 115 (1900), sphalm., non Stokes in Bot. Mat. Med. **3,** 168 (1912). Although both these names are synonymous with *Acacia senegal*, sens. lat. (in my opinion), they are not based in the same type.

A. rostrata Sim, Forest Fl. Port. E. Afr. 55, t. 37A (1909), non Humb. & Bonpl. ex Willd., Sp. Pl. **4,** 1060 (errore typogr. 1054) (1806).

Southern Rhodesia. ? Marandellas or Charter District. Banks of Sabi River, alt. 490 m., 28 June 1934, *Michelmore* 285 :—single bush on flood terrace, in company with *Acacia albida*, *A. spirocarpa*, etc.

Bechuanaland. Dikhatlon Ranch, 14 Apr. 1931, *Pole-Evans* 3189 (39).

South West Africa. Okahandja District. Okahandja, alt. 1300 m., Nov. 1906, *Dinter* 222 :—upon a hill of mica-schist ; shrub with broadly obovate outline ; flowers yellowish-white ; native name "Okaliangawa". Karibib District. In hills near Usakos, alt. 750 m., May 1886, *Marloth* 1257 (K, isotypus *A. spinosae* et *A. trispinosae* :—shrub 1-2 m. high. Karibib, 30 Jan. 1934, *Dinter* 6926. Gibeon District. Gibeon, on dry shale, 14 Dec. 1915, *H. H. W. Pearson* 9207 :—bush 1 m. high ; flowers white ; ' pod like that of *A. detinens* '. District uncertain. Hills behind Gamis Farm House, 26 Dec. 1915, *H. H. W. Pearson* 8977 :—bush inverted cone-shaped, 1–2·4 m. high.

Transvaal. Zoutpansberg District. Dongola Reserve, Weipe, 26 Dec. 1945, *Pole Evans* 4491. Same locality, 15 Mar. 1948, *Verdoorn*

2262 :—shrub 2 m. high, branchlets divaricate, whitish, interwoven at top ; stem slender, whitish too. Same locality and date, *Verdoorn* 2263 : —stem small, branched at base ; branches dark, branchlets white, interlacing ; pods rostrate. Same locality and date, *Verdoorn* 2264 (K, typus varietatis) :—3 m. high, 7 m. spread, branches dark. Dongola Reserve, Schroda, 15 Mar. 1948, *Verdoorn* 2272 :—shrub. Dongola Reserve, Farm Shutwater 709, 10 miles N.W. of Dongola Camp, alt. 520 m., 27 Apr. 1948, *L. E. Codd* 4087 :—in *Acacia stuhlmannii—A. spp.* association on grey brackish flats. Belfast District. Machadosdorp, Schoemanskloof, 5 Aug. 1933, *Pole Evans* s.n.

Portuguese East Africa. Lourenço Marques Province. Frequent in the thornveld, Lourenço Marques and Maputa. *Sim* 6263 (not seen, fide Sim. l.c.).

Swaziland. Hluti to Gollel, 9 Dec. 1931, *Pole Evans* 3393 (2). Banks of Mzimpofu River, 11 Dec. 1931, *Pole Evans* 3418 (27).

Zululand. Black Umfolozi R. (in game reserve), 16 Apr. 1923, *Swynnerton* 4040.

Occasional slightly acuminate pods may occur in normal *A. senegal*, mingled with others that are obtuse or merely acute ; but they are never constantly and strongly beaked as in var. *rostrata*. One subacuminate pod is shown on the type-specimen of *A. senegal*, a photograph of which I have seen, thanks to my colleague, Mr. E. Milne-Redhead.

Miss I. C. Verdoorn, Division of Botany and Plant Pathology, Pretoria, South Africa, kindly sent an admirable series of specimens and accompanying photographs of var. *rostrata* and var. *leiorhachis* from Dongola Reserve, Transvaal, pointing out at the same time the extraordinary and striking habit difference between the two : var. *rostrata* having a broad dense flat-topped or umbrella-shaped crown, and var. *leiorhachis* having a lax irregular crown with projecting virgate branches.

Typical *A. senegal* from tropical Africa seems to be nearer to var. *leiorhachis* in habit than to var. *rostrata*.

There is no doubt that var. *rostrata* is a very distinct plant, with a markedly southern distribution. A single specimen from Hargeisa in Somaliland, *Gillett* 3954 (K.), has the pods rostrate at the apex as in var. *rostrata*, and I really do not see at present any difference of importance ; however this is so far separated geographically from the next locality of var. *rostrata*, in Southern Rhodesia, that I do not feel confident about the naming, especially as I have no certain information about its habit, and the variation of *A. senegal* in Somaliland has still to be worked out.

Although three binomials are given in synonymy under var. *rostrata*, each is a later homonym and must be rejected. If the differences between var. *rostrata* and *A. senegal* are ever shown to be specific, then the former must be given a new name. It should be made clear that the varietal epithet that I have chosen, *rostrata*, is a new name, and not based on *Acacia rostrata* Sim.

J. P. M. Brenan.

Acacia hamulosa *Benth.* in Hook., Lond. Journ. Bot. **1,** 509 (1842) ; et in Trans. Linn. Soc. **30,** 516 (1875) ; Krause in Engl., Bot. Jahrb. **35,** 714 (1905), excl. syn. *A. asak* Willd. et *A. hunteri* Oliv. ; Blatter, Fl.

Aden, 191 (1915), excl. syn. *A. hunteri* Oliv. (Non *A. hamulosa* Benth. sec. Bak. f. in Kew Bull. **1894,** 332 (1894), quae = *A. mellifera* Benth.).

[*Acacia asak* (non (Forsk.) Willd.)—auct. e.g. Schweinf. in Bull. Herb. Boiss. **4,** app. 2, 215 (1896) ; Fiori in Agric. Colon. **5,** 93 (1911) ; Harms in Engl., Pflanzenw. Afr. **3** (**1**) (Engler & Drude, Veg. Erde, 9), 379 (1915) ; Blatter, Fl. Arabica, **2,** 183 (1921), excl. syn. *A. hunteri* Oliv. ; C. Christensen in Dansk Bot. Arkiv, **4** (**3**), 29 (1922) ; Bak. f., Leg. Trop. Afr. 826 (1930), excl. syn. *A. hunteri* Oliv. ; O. Schwarz in Mitteil. Inst. allg. Bot. Hamburg, **10,** 83 (1939), omn. saltem pro parte.].

Until now *A. asak* has been generally confounded with *A. hamulosa* Benth. Indeed Bentham when he described his new species *A. hamulosa* suggested that it might perhaps prove the same as *A. senegal* or *A. asak*, and later, in 1875, wrote : " *Mimosa Asak*, Forsk is probably the *A. hamulosa*." With such doubts in the author's own mind about his species it is not surprising that the name *A. hamulosa* has been gradually displaced by *A. asak*. Bentham need not have worried.

A. hamulosa is a species akin to *A. senegal* (L.) Willd., but very easily and certainly distinguished by a character strangely overlooked by previous authors—the presence of a single recurved prickle just below the apex of each pinna, borne on the lower side of the rhachis ; other species may have the rhachis of the *leaf* prickly but not those of the pinnae. Coupled with this useful vegetative character are broad somewhat undulate straw-coloured to pale brown pods 4–6 cm. long and 2·6–3·7 cm. wide, and a low shrubby habit, with a height of 0·6–1·8 m. The foliage ranges from glabrous to finely pubescent. *A. hamulosa* occurs in Arabia (various collectors e.g. *Fischer* 72 (type !), *Schimper* 865, *Schweinfurth* 71, 97) and in Somaliland (*James & Thrupp s.n.*, *R. N. Farquharson s.n.*, *Gillett* 4178 (pro max. parte), *Glover & Gilliland* 234, 981). Further Arabian localities are given in Schwarz (*l.c.*), including however two specimens wrongly placed—the type of Forskål's *A. asak*, of which more later on, and *Lunt* 223, the specimen of which at Kew is *A. mellifera* Benth. I have not seen Schweinfurth's specimens from Eritrea cited under *A. asak* in Bull. Herb. Boiss. **4,** app. 2, 215 (1896), but they may well be *A. hamulosa* also.

A. hunteri Oliv. in Hook., Ic. Pl. t. 1350 (1881) has repeatedly been made a probable synonym of *A. hamulosa*, but is perfectly distinct in lacking the characteristic prickle on each pinna, and in having tiny pods 2–3 cm. long and only 0·8 cm. wide.

The type of *Mimosa asak* Forsk., which will be discussed more fully under the following species, is not conspecific with *A. hamulosa* because of the unarmed rhachides of the leaves and pinnae.

J. P. M. Brenan.

Acacia nubica Benth. in Hook., Lond. Journ. Bot. **1,** 498 (1842) ; Schweinf. in Linnaea, **35,** 337 (1867–8) ; Oliv. in Fl. Trop. Afr. **2,** 348 (1871) ; Benth. in Trans. Linn. Soc. **30,** 511 (1875) ; Harms in Engl., Pflanzenw. Afr. **3** (**1**) (Engl. & Drude, Veg. Erde 9), 368 (1915) ; Blatter, Fl. Aden, 192 (1915).

Acacia aucheri Benth. in Hook., Lond. Journ. Bot. **1,** 499 (1842).

Acacia pterygocarpa Hochst. ex Benth. in Hook., Lond. Journ. Bot. **5,** 96 (1846) ; et ex A. Rich., Tent. Fl. Abyss. 1, **239,** (1847).

Acacia nubica Benth. var. *erythraea* Schweinf. in Linnaea **35,** 338 (1867–8).

Acacia nubica Benth. var. *aethiopica* Schweinf. *l.c.* (1867–8).

Acacia merkeri Harms in Notizbl. Bot. Gart. Berlin **3,** 195 (1902), nomen nudum ; et in Engl., Bot. Jahrb. **36,** 208 (1905), cum descr.

[*Acacia orfota* (non (Forsk.) Schweinf.)—auct., e.g. Schweinf. in Bull. Herb. Boiss. **4,** app. 2, 213 (1896) ; Fiori in Agric. Colon. **5,** 87 (1911) ; Blatter, Fl. Arabica, **2,** 186 (1921) ; C. Christensen in Dansk Bot. Arkiv, **4** (**3**), 29 (1922), quoad syn. *A. nubica* Benth. ; Bak. f., Leg. Trop. Afr. 839 (1930) ; O. Schwarz in Mitteil. Inst. allg. Bot. Hamburg, **10,** 85 (1939)].

Acacia orfota (Forsk.) Schweinf. has been by most authors adopted as the valid name for the plant otherwise known as *A. nubica* Benth. Examination of Forskål's type of *Mimosa orfota* shows that this is wrong.

The type-specimen consists of a young flowering and leafy shoot about 15 cm. long. The stem is rather sharply longitudinally ridged with deep furrows between the ridges ; particularly in these furrows there are numerous minute sessile dark reddish glands, readily visible with a × 10 lens. The colour of the stem is a rather dark brown. There are 4–5 pairs of pinnae, with 8–12 pairs of leaflets on each of the upper ones. The leaflets are closely arranged, and mostly distinctly acute at the apex. The peduncles are 1·2–1·5 cm. long, shortly and rather appressedly pubescent, and with sessile glands similar to those on the young stems.

In *A. nubica* there are no such glands as mentioned above, the stems are paler and less sharply ridged, and the leaflets less closely and less rigidly arranged on the pinnae. Forskål's description mentions that the pod is " inarticulata, compressa, basi attenuata ", but the type-specimen shows no pods.

For the identity of *Mimosa orfota*, see the following species.

J. P. M. Brenan.

Acacia orfota (*Forsk.*) *Schweinf.* in Bull. Herb. Boiss. **4,** app. 2, 213 (1896), quoad nomen et syn. *Mimosa orfota* Forsk. tantum, non auct. al., quae = *A. nubica* Benth.

Mimosa orfota Forsk., Fl. Aegypt.-Arab. 177 (1775).

Forskål's type-specimen is, as we have said above, a juvenile snippet in flower. In many of its features it very closely resembles *Acacia seyal* Del., leading me at first to think it conspecific. The only exact match I had for Forskål's plant then was *Hunter* 114, a rather poor specimen at Kew. Since then I have seen splendid material of the same plant at the British Museum (Natural History), which indicates that it is distinct from *A. seyal* and apparently a species endemic to SW. Arabia that has been very rarely indeed collected.

A. orfota apparently differs from *A. seyal* in being a low bush 60–90 cm. high, in having non-peeling bark on the twigs, leaflets very acute or long-mucronate, pods straight or very slightly curved, about 10 cm. long and 7–8·5 mm. wide.

I have seen the following specimens of *A. orfota* :—

Arabia. Yemen, western foothills of Tihama, Wādi Surdud, *Forskål s.n.* (C). Neighbourhood of Aden : " Harir Herb Useless Present Zurbi " [this is what the collector has written on the label ; what it means I do not know], Sept. 1880, *F. Hunter* 114. Dhala Highlands, Jebel Jihaf, alt. c. 2130 m., 7 Oct. 1937, *H. Scott & E. B. Britton* 149 (BM) :— thorny bush mimosa ; flowers yellow ; this is the common mimosa bush 60–90 cm. high, all over Jihaf.

I must thank very sincerely Miss D. Hillcoat at the British Museum (Natural History), who kindly drew my attention to *Scott & Britton* 149, the specimen which really enabled *A. orfota* to be properly interpreted.

J. P. M. Brenan.

Cathormion eriorhachis (*Harms*) *Dandy* in F. W. Andr., Flow. Pl. Anglo-Egypt. Sudan, **2,** 155 (1952).

Albizzia eriorhachis Harms in Engl., Bot. Jahrb. **53,** 456 (1915).

Pithecellobium eriorhachis (Harms) Harms in Notizbl. Bot. Gart. & Mus. Berl.-Dahl. **8,** 146 (1922) ; Bak. f., Leg. Trop. Afr. **3,** 871 (1930).

J. E. Dandy.

Urticaceae

Fleurya ovalifolia (*Schumach.*) *Dandy* in F. W. Andr., Flow. Pl. Anglo-Egypt. Sudan, **2,** 277 (1952).

Haynea ovalifolia Schumach. in K. Dansk. Vid. Selsk. Naturvid. & Math. Afhandl. **4,** 180 (1829).

Fleurya podocarpa Wedd. in DC., Prodr. **16** (**1**), 76 (1869) ; Rendle in Prain, Fl. Trop. Afr. **6** (**2**), 251 (1917) ; Hutch. & Dalz., Fl. W. Trop. Afr. **1,** 441 (1928).

J. E. Dandy.

Celastraceae

Maytenus rhodesica *Exell*, sp. nov.

Frutex sempervirens inermis, 3 m. altus, ramulis gracilibus glabris. *Folia* alterna, breviter petiolata, petiolo 2–5 mm. longo, lamina tenuiter papyracea, anguste ovata vel elliptica vel anguste elliptica, apice paullo acuminata apiculata, margine serrulata, basi cuneata vel rotundata, ad 11 × 5 cm., omnino glabra, costa media supra plana vel impressa, subtus prominente, nervis lateralibus 6–7-paribus, paullo conspicuis. *Flores* rubiginosi, graciliter pedicellati, pedicello ad 1·8 cm. longo glabro, in cymas pseudo-umbellatas pedunculatas, pedunculo 1–1·5 cm. longo, dispositi. *Sepala* 5, late suborbicularia, 1 × 1·2 mm., glabra. *Petala* 5, suborbicularia imbricata, 2·5 × 3 mm., glabra. *Stamina* 5, antheris 0·5 mm. longis, filamentis brevissimis 0·2–0·3 mm. longis. *Discus* 1·5 mm. in diam., glaber. *Ovarium* 3-loculare, loculis 2-ovulatis, stylo 3-fido brevissimo. *Capsula* 2-locularis, 8–9 mm. longa, seminibus (immaturis ?) in arillo perfecte inclusis.

Northern Rhodesia. Mwinilunga District. Evergreen vegetation by R. Matonchi near dam, 6 Nov. 1938, *Milne-Redhead* 3129 (K, typus) :—

" evergreen shrub, 3 m. with few flowers and unripe fruits ; petals and disk dull red."

This species, characterised by the thinly papyraceous leaves and rather thin-walled capsule, is also remarkable for the fact that while all the flowers dissected were clearly 3-locular, the two fruits available are 2-locular, presumably through abortion of one loculus. This makes the usual separation of the African species of *Gymnosporia* (now considered to belong more properly to *Maytenus*) into 2-locular and 3-locular groups appear unreliable, as had already been suspected by Loesener. Both genera and species of the *Celastraceae* are, however, so featureless and devoid of distinguishing characters that it is difficult to produce a satisfactory classification. Loesener's separation of *Gymnosporia* from *Maytenus* (in Engl. & Prantl, Nat. Pflanzenfam., ed. 2, **20b,** 109 : 1942) on the presence in the former of either thorns or inflorescences borne on short shoots, appears artificial, and there seems little point in keeping the two genera distinct.

A. W. Exell.

Vitaceae

Rhoicissus revoilii *Planch.* in DC., Monogr. Phan. **5** (**2**), 469 (1887).

A sterile specimen which I feel convinced can be nothing other than this species was recently brought in for identification by Mrs. Nattrass of the Scott Agricultural Laboratories, Nairobi. It had been collected locally. The attached rootstock is altogether extraordinary and seems worthy of note since no mention of the rootstock could be found in the literature. The thick horizontal branches of the root bore large spherical tubers up to 12·5 cm. diameter hanging by thin branch rootlets 2·5–7·5 cm. long and only 3 mm. diameter.

B. Verdcourt.

Burseraceae

Commiphora pyracanthoides *Engl. sens. lat.* Ample material, accompanied by careful field-notes and photographs, sent by Miss I. C. Verdoorn of the Division of Botany and Plant Pathology, Pretoria, South Africa, has allowed the taxonomy of this difficult group to be straightened out.

C. viminea Burtt Davy, from the Transvaal, has been sometimes confused with *C. pyracanthoides* sens. lat., but is separated easily by the deep plum-coloured twigs often somewhat glossy, with coarse longitudinal wrinkles, the leaves with glabrous or almost so petioles and few (3 (–4) each side) primary lateral nerves. The *C. pyracanthoides* group has normally grey rarely plum-coloured, not glossy twigs more finely and closely wrinkled, the leaves with pubescent petioles and 4–7 pairs of primary lateral nerves. *C. viminea* Burtt Davy is really closer to the East African *C. merkeri* Engl. and may perhaps prove no more than varietally distinct.

The remainder of the *C. pyracanthoides* group sorts itself out into two species which are separated by the following characters and for which I propose the following names :—

(1) *Commiphora pyracanthoides* Engl., sens. strict., emend. Brenan.

Shrubby with two or more stems never more than 7·5 cm. in diameter, usually less. Calyx glabrous.

(2) *Commiphora glandulosa* Schinz. Small tree up to 7·5 m. Leaves with a tendency to be larger than the last, with more pubescence round their base, and often more cuneate below. Calyx densely glandular.

The application of the names must next be discussed. *C. glandulosa* is clear, and I am indebted to the authorities at Zurich University for kindly sending the type-specimen (*Schinz* 767) on loan to me. Although it is leafless, it is in full bloom and shows beautifully the characteristically glandular calyces.

The type-specimen (*Ilse Fischer* 168) of *C. pyracanthoides* I have not seen, and it is now probably destroyed. Engler's original description of *C. pyracanthoides* is so indefinite that I do not think it possible to pin it down certainly to either *C. pyracanthoides* or *C. glandulosa*. There is thus a case for rejecting *C. pyracanthoides* Engl. as a *nomen ambiguum*. However *Pearson* 9747 from SW. Africa, now in the Kew Herbarium, was sent to Berlin in 1929 and bears a label written by Melchior saying that it agrees completely with material named as *C. pyracanthoides* by Engler himself. *Pearson* 9747 has glabrous calyces and is certainly *C. pyracanthoides* Engl., as defined above. To save the familiar name *C. pyracanthoides* Engl., I propose that *Pearson* 9747 in the Kew Herbarium be accepted as its " neotype ".

The nomenclature and distribution of these two species are as follows:—

Commiphora pyracanthoides Engl. in Engl., Bot. Jahrb. **26,** 368 (1899) ; Engl. in Engl. & Prantl, Pflanzenfam., ed. 2, **19a,** 437 (1931).

Bechuanaland (tropical). Litauani (= ? Towani), *Seiner*, II, 103.

South-West Africa. Hereroland, Otjimbingwe, *Ilse Fischer* 168 (typus, not seen). On hill behind Gamis Farm House, 26 Dec. 1915, *H. H. W. Pearson* 8979 :—bush 45 cm. Great Karasberg, Krai Kluft, upper slopes and plains, 1520 m., 23 Dec. 1912, *H. H. W. Pearson* 8272. Little Karas Mountains, western foothills, sandy streams near Holoog, 19 Jan. 1916, *H. H. W. Pearson* 9747 (K, neotypus) :—bush 1·2–2·4 m.

Transvaal. Zoutpansberg District. Zoutpan 193, on N. side of Pan, under acacias, 20 Nov. 1932, *Obermeijer, Schweickerdt & Verdoorn* 48 :—small shrub 1 m. high ; short stems ; branches spreading. Farm Zoutpan 193, N. side of Salt pan, 20 Nov. 1932, *Obermeijer, Schweickerdt & Verdoorn* 49 :—shrub 1 m. ; short stems ; branches spreading. Zoutpansberg, in *Cataphractes* belt, 12 Apr. 1934, *Schweickerdt & Verdoorn* 512 :—leaves simple ; flowers red and yellow. On banks of river N. of Wyliespoort, 17 Sept. 1934, *Pole-Evans* 3734. 1·6 miles SW. of Dongola Camp, Dongola Reserve, in mopane veld on red, gritty flats in slight depression, 610 m., 28 Apr. 1948, *L. E. Codd* 4101 :—bushy shrub 1·5 m. high ; green simple leaves. Below Ipedi and Dongola Camp, Dongola Reserve, in low-lying flats, *Verdoorn* 2303 :—bushy shrub forming dome-like thicket, very spiny. Potgietersrust District. 28 miles from Swerwerskraal, 22 Jan. 1929, *Hutchinson* 2650. Waterberg District. Kurkbosch, 29·9 miles from Kruispan, 13 Feb. 1929, *Pole-Evans* 33.

Swaziland. Nsoko-Maloma, 10 Dec. 1931, *Pole-Evans* 3404 (13).

Zululand. Nduma Game Reserve, 1 Dec. 1938, *J. Gerstner* 3148.

Commiphora glandulosa *Schinz* in Bull. Herb. Boiss., Sér. 2, **8,** 633 (1908).

Commiphora lugardae N. E. Br. in Kew Bull. **1909,** 99 (1909) ; Burtt Davy, Fl. Transv, **2,** 485 (1932).

Commiphora seineri Engl. in Engl., Bot. Jahrb. **44,** 145 (1910) ; op. cit., **48,** 480 (1912) ; Engl. in Engl. & Prantl ; Nat. Pflanzenfam., ed. 2, **19a,** 437 (1931) ; Burtt Davy, Fl. Transv., **2,** 485 (1932).

Commiphora berberidifolia Engl. in Engl. Bot. Jahrb. **48,** 480 (1912) ; Engl. in Engl. & Prantl, Nat. Pflanzenfam., ed. 2, **19a,** 437 (1931).

Portuguese East Africa. Manica e Sofala Province. Between Tette and Kawabasia [Kebrabasa], Nov. 1858, *Kirk* s.n.

Southern Rhodesia. Gwanda District. About 50 miles N. of Beit Bridge, towards Gwanda, 8 May 1948, *R. J. Rodin* 4517 :—tree 7·5 m. high ; bark grey, papery ; deciduous at this season. " South African Gold-Fields ", 1870, *Baines* s.n. Without locality, *Queen Victoria Memorial Herbarium* 8891.

Bechuanaland (tropical). Kwebe Hills, 910–1070 m., 1 Sept. 1897, *Mrs. Lugard* 23 (K, typus *C. lugardae*) :—thorn-tree 6 m. high, up to 100 cm. in girth ; exudes quantities of soft pink and white gum, standing out in knobby balls ; said to be a poisonous tree, flowering before leaves ; male and female flowers borne on separate trees, flowers varying pink to green ; fruits green, red when ripe. NE. edge of Makarikari, 12 Dec. 1929, *Pole-Evans* 2595.

Northern Rhodesia. Barotseland, Sesheke, in tree-steppe on a former flood-plain of the Zambesi on hard grey-white sand, 5 Oct. 1906, *Seiner* 57 (typus *C, seineri*, not seen). Mazabuka District. Mazabuka, 1160 m., on limestone ridge, Feb. 1933, *Trapnell* 1161. Mazabuka, on limestone outcrops, but also on anthills etc. in swampy country, 1100 m., Dec. 1933, *Trapnell* 1387 :—small, spiny tree 4·5–6 m. high. Kafue Flats near Mazabuka, 7 Oct. 1930, *Milne-Redhead* 1223 :—small leafless bushy tree in grassland ; petals reddish. Same locality and date, *Milne-Redhead* 1223A :—fruits from another tree, unripe, green.

South-West Africa. Amboland, Omulonga in Ondonga, Nov., *Schinz* s.n. (not seen). Ombandja, 29 Sept. 1885, *Schinz* 767 (Z, typus *C. glandulosae*). Damaraland, *Dinter* 385 (K, fragm. typi *C. berberidifoliae*, vide infra). Nankluft Mountains, on rocks, 31 Dec. 1915, *H. H. W. Pearson* 9109 :—bush 1·8–2·4 m. [identification probable but not certain]. Otavi, 28 Dec. 1924, *Dinter* 5237.

Transvaal. Zoutpansberg District. Limpopo R. near Messina, Dec. 1928. *Hutchinson* 2107. Dongola, near Limpopo, Dec. 1928, *Hutchinson* 2142. Waterpoort, Dec. 1931, *W. J. Jones* 10165. Dongola Reserve, foot of Epedi Hill on boundary between Giesendam and Hartjesveld, in mopane veld on stony hillside, 610 m., 28 Apr. 1948, *L. E. Codd* 4102 :—tree 3·6 m. high with greenish mottled bark and green simple leaves. Dongola Reserve, Farm Hamilton, 0·4 m. E. of boundary with La Reve, in mixed mopane veld on red gritty slopes, 550 m., 29 Apr. 1948, *L. E. Codd* 4115 :—tree 3 m. ; large lenticels ; simple glaucous leaves. Waterberg District. 25 m. N.N.W. of Vaalwater, 26 Dec. 1934, *Smuts* 352. Without locality, *F. A. Rogers* 22263.

I have not seen the type of *C. seineri*, but the glands on the calyx are clearly mentioned, and I have no doubt that it is our plant. *C. berberidifolia* is rather a problem. The description is indefinite, and the fragment of the type at Kew I am inclined to put to *C. glandulosa*, though it may quite possibly be *C. pyracanthoides*. I am quite unwilling to replace *C. pyracanthoides*, whose original application is doubtful, with another equally doubtful name.

J. P. M. Brenan.

Anacardiaceae

Rhus ochracea *Meikle*, sp. nov., *R. anchietae* Ficalho et Hiern affinis, sed foliis supra scabridis, subtus conspicue ochraceis, juventute nec nitidis nec glutinosis valde differt.

Frutex erectus, circiter 1 m. altus ; rami plerumque e basi exorti, teretes, minute longitudinaliter striatuli, rufescentes, molliter pubescentes. *Folia* trifoliolata, juventute subcoriacea, pubescentia, glandulis ochraceis utrinque ornata, maturitate coriacea, scabrida, subglabra ; petioli usque 2·5 cm. longi, 1·5 mm. lati, subtus convexi, striati, supra applanati vel leviter canaliculati, pubescentes ; foliolum terminale obovatum vel ellipticum, integrum, usque 9 cm. longum et 4 cm. latum, apice obtusum vel acutum, mucronatum, basin versus in petiolulum circiter 1 cm. longum coartatum ; lamina utrinque eleganter reticulata, venulis prominentibus, supra saturate viridis, scabrida, costa et nervis parce pilosis, subtus squamis glandulosis ochraceis conspicue obtecta, costa nervis et venulis distincte villosis, marginibus valde recurvatis ; foliola lateralia quam terminalia breviora, usque 6 cm. longa et 2·5 cm. lata, apice plerumque obtusiora, basi subsessilia. *Inflorescentia* terminalis vel subterminalis, paniculata, laxa, multiramosa, foliosa, pubescens, circiter 20–35 cm. longa et 10–25 cm. lata, folia valde excedens ; bracteae parvae, subulatae, usque 2 mm. longae et 0·5 mm. latae, pubescentes. *Flos* ♂ flavovirens, circiter 4 mm. diametro. *Calyx* extra pilosus, intus glaber, in lobos 5 subacutos divisus. *Petala* 5, oblonga, glabra, usque 1·5 mm. longa et 1 mm. lata. *Stamina* 5 ; filamenta glabra, usque 0·75 mm. longa ; antherae circiter 0·5 mm. latae et longae. *Discus* glaber, valde undulato-crenatus, cyathiformis. *Flos* ♀ et fructus ignoti.

Tanganyika. East shore of Lake Tanganyika, 1894, *Scott-Elliot* 8260. Rungwe District. Bulambya, Mujelengwa River, 5 Dec. 1912, *Stolz* 1724 :—flowers yellow-green.

Nyasaland. North Nyasa District. Fort Hill, 1100–1220 m., July 1896, *A. Whyte s.n.* (K, typus).

Northern Rhodesia. Abercorn District. North of Abercorn, 1520 m., 7 July 1941, *Greenway* 6204 :—" A virgately branched shrub up to 2 ft. tall with panicles of yellow-green flowers. Local in a bush road in *Brachystegia spiciformis-Isoberlinia paniculata-Uapaca-Syzygium* woodland in a brown sandy loam." Abercorn, 21 September 1949, *Bullock* 1026 :—secondary growth in *Brachystegia* ; " subshrub, evidently new growth from an old stump."

R. D. Meikle.

Ebenaceae

Euclea schimperi (*A.DC.*) *Dandy* in F. W. Andr., Flow. Pl. Anglo-Egypt. Sudan, **2,** 370, fig. 137 (1952).

Myrsine kellau Hochst. in Flora **24,** Intelligenzbl. 1, 25 (1841), *nomen nudum.*

Kellaua schimperi A. DC. in Ann. Sci. Nat., ser. 2, Bot. **18,** 209 (1842) ; DC., Prodr. **8,** 290 (1844).

Euclea kellau Hochst., op. cit. **26,** 83 (1843), *nomen illegitimum* ; A. DC. in DC., tom. cit. 672 (1844) ; A. Rich., Tent. Fl. Abyss. **2,** 24 (1851) ; Hiern in Trans. Cambr. Phil. Soc. **12,** 103 (1873) ; Hiern in Oliv., Fl. Trop. Afr. **3,** 514 (1877).

The above names are all based on *Schimper* 159, a fruiting gathering from Abyssinia. Hochstetter's original name, *Myrsine kellau*, was published only as a *nomen nudum.* This was in 1841, and in the same year A. De Candolle (in Ann. Sci. Nat., ser. 2, Bot. **16,** 96) excluded the plant from *Myrsinaceae* and treated it as a new genus (*Kellaua*) of *Oleaceae* without, however, describing it. In 1842 A. De Candolle described the genus *Kellaua* and named the species *K. schimperi.* A year later Hochstetter described the same plant, together with a flowering gathering (*Schimper* 1078), under the name *Euclea kellau*, this of course being a superfluous change of epithet. A. De Candolle, in DC., Prodr. **8,** 674 (1844), suggested that *Schimper* 159 and *Schimper* 1078 were different plants, but Hochstetter's treatment of them as conspecific has been accepted by A. Richard, Hiern and subsequent authors.

J. E. Dandy.

Asclepiadaceae

Asclepias pedunculata (*Decne.*) *Dandy* in F. W. Andr., Flow. Pl. Anglo-Egypt. Sudan, **2,** 401 (1952).

Asclepias macrantha Hochst. [in Flora **27,** 101 (Feb. 1844), *nomen synonymum*] ex Oliv. in Trans. Linn. Soc. **29,** 111 (1875), *nomen illegitimum* ; N. E. Br. in Dyer, Fl. Trop. Afr. **4** (**1**), 340 (1902).

Pachycarpus corniculatus Hochst. in Flora **27,** 101 (Feb. 1844), *nomen nudum.*

Gomphocarpus pedunculatus Decne. in DC., Prodr. **8,** 558 (Mar. 1844) ; A. Rich., Tent. Fl. Abyss. **2,** 40 (1851).

Gomphocarpus longipes Oliv., tom. cit. 111, t. 75 (1875), *nomen synonymum.*

Stathmostelma pedunculatum (Decne.) K. Schum. in Engl., Bot. Jahrb. **17,** 132 (1893).

The name *Asclepias macrantha* was originally published by Hochstetter in February 1844 as a synonym of *Pachycarpus corniculatus* which itself was a *nomen nudum.* Later in the same year the same plant was described and legitimately named *Gomphocarpus pedunculatus* by Decaisne, who cited *A. macrantha* as a synonym. Oliver's subsequent adoption of the name *A. macrantha* in 1875 is illegitimate, as he should have taken up Decaisne's specific epithet. K. Schumann used the correct epithet under *Stathmostelma.*

J. E. Dandy.

RUBIACEAE

Aidia genipiflora (*DC.*) *Dandy* in F. W. Andr., Flow. Pl. Anglo-Egypt Sudan, **2,** 424 (1952).

Randia genipaeflora DC., Prodr. **4,** 389 (1830) ; Hiern in Oliv., Fl. Trop. Afr. **3,** 95 (1877) ; Hutch. & Dalz., Fl. W. Trop. Afr. **2,** 79 (1931).

This is one of the tropical African representatives of the genus *Aidia* Lour. (*Stylocoryna* Cav. ; *Gynopachis* Bl.) as defined by G. Taylor in Exell, Cat. Vasc. Pl. S. Tomé, 197 (1944). The same genus is recognized by Fagerlind in Ark. för Bot. **30A** (**7**), 12, 42 (1942), under the name " *Stylocoryne* ".

J. E. DANDY.

Lachnosiphonium niloticum (*Stapf*) *Dandy* in F. W. Andr., Flow. Pl. Anglo-Egypt. Sudan, **2,** 441, fig. 159 (1952).

[*Gardenia dumetorum* (non Retz.).—Schweinf., Beitr. Fl. Aethiop. **1,** 135, 282, t. 3 B (1867).]

[*Randia dumetorum* (non Poir.).—Hiern in Oliv., Fl. Trop. Afr. **3,** 94 (1877) *pro parte.*]

Randia nilotica Stapf in Journ. Linn. Soc., Bot. **37,** 519 (1906) ; Broun & Massey, Fl. Sudan, 262 (1929) ; Hutch. & Dalz., Fl. W. Trop. Afr. **2,** 78 (1931).

According to recent authors, e.g. Fagerlind in Ark. för Bot. **30A** (**7**), 41 (1942), and G. Taylor in Exell, Cat. Vasc. Pl. S. Tomé, 197 (1944), the genus *Randia* L. (sensu stricto) does not occur in Africa. *Lachnosiphonium* Hochst. appears to be the generic name applicable to *R. nilotica* and its allies.

J. E. DANDY.

Rothmannia whitfieldii (*Lindl.*) *Dandy* in F. W. Andr., Flow. Pl. Anglo-Egypt. Sudan, **2,** 461, fig. 165 (1952).

Gardenia whitfieldii Lindl. in Edw., Bot. Reg. **31,** sub t. 47 (1845).

Gardenia malleifera Hook. in Curt., Bot. Mag. **73,** t. 4307 (1847).

Rothmannia malleifera (Hook.) Hook., Niger Fl. 384 (1949) ; Fagerlind in Ark. för Bot. **30A** (**7**), 39 (1942).

Randia malleifera (Hook.) Hook. f. in Benth. & Hook., Gen. Pl. **2,** 89 (1873) ; Hiern in Oliv., Fl. Trop. Afr. **3,** 98 (1877) ; Hutch. & Dalz., Fl. W. Trop. Afr. **2,** 78, fig. 200 (1931).

J. E. DANDY.

Tricalysia angolensis A. Rich. in DC. Prod. **4,** 445 (1830) ; et in Mém. Soc. Hist. Nat. Paris **5,** 224 (1834) ; Hiern in Oliver, Fl. Trop. Afr. **3,** 125 (1877).

[*Tricalysia benguellensis* (non Welw. ex Hiern)—K. Schum. in Warb., Kunene-Sambesi Exped. 385 (1903) ; R. Good in Journ. Bot. **64,** Suppl. 2, 18 (1926).]

This species, the type of the genus, was not examined by Hiern when he worked out the *Rubiaceae* for the Flora of Tropical Africa, and ever since it has remained rather an enigma, tacitly disregarded by botanists working on the flora of Angola. Lately, thanks to the courtesy of the Director

of the Muséum d'Histoire Naturelle de Paris, the type-specimen of *T. angolensis* has been loaned to us. The description in the Flora of Tropical Africa may as a result be added to or amplified in several ways, as follows :—

Young branchlets very shortly but rather densely puberulous ; older dark purplish-brown (probably burned). *Leaves* subsessile, petiole scarcely distinct from lamina ; lamina coriaceous, linear-lanceolate to linear-oblanceolate (2–) 4·2–5·5 cm. long, (0·4–) 0·7–1·0 cm. wide, obtuse not acuminate at apex, glabrous or nearly so above, dark brown or dark greenish-brown and slightly shining, very much paler beneath and pubescent except on midrib, which is slightly impressed above and quite prominent beneath, primary lateral nerves about 3–4 on each side of midrib, raised and rather conspicuous above, almost invisible beneath, margins narrowly recurved. *Inflorescences* axillary, sessile, solitary, 1–3-flowered ; bracteoles imbricate, densely pubescent outside, lower ones connate into a little cup about 1 mm. long, the upper about 1·5 mm. long investing the base of the ovary. *Calyx-limb* about 1·5 mm. long and 2·5 mm. wide at apex, minutely denticulate with teeth less than 0·5 mm. long, densely appressed-pubescent outside. *Ovary* glabrous. *Corolla-tube* glabrous outside, about 3 mm. long and 1 mm. diameter ; lobes broadly elliptic, 3·5–4·5 mm. long and about 2·5 mm. wide, densely appressed-pubescent outside (except where overlapped), glabrous inside. *Stamens* exserted, filaments about 1·5 mm. long, anthers about 3·5 mm. long. *Style* glabrous.

The above account is drawn up exclusively from the type-specimen. The following specimens I consider to be conspecific :—

Northern Rhodesia. Mwinilunga District. Hillwood Farm, 1 Oct. 1937, *Milne-Redhead* 2520 :—in *Brachystegia* woodland ; shrub to 1 m. high ; old and young leaves—old green, pale beneath ; corolla cream ; filaments and styles white ; scent strong, unpleasant.

Angola. " Angola ", *Unknown collector s.n.* (P, typus). Bié District. On the R. Cuebe, alt. 1150 m., 28 Oct. 1899, *Baum* 334 :—on white sandy soil on river bank ; low shrub 40–50 cm. high ; flowers cream. Near the Forte Prinsepo Amélia, Sept. 1905, *Gossweiler* 1964 (BM) :—in mixed woods in a shady locality, and common in the mixed secondary woods near here ; a caespitose evergreen undershrub with extensively spreading subterranean stems giving off leafy stems in a caespitose fashion ; stem erect, 30–45 cm. high, branched, obscurely square ; leaves dusky green, coriaceous ; flowers pure white, scented. Near Cambambe, Cuebe, June 1906, *Gossweiler* 2620 (BM) :—common in short thickets and pasturage. Near Munongue, Apr. 1906, *Gossweiler* 3437 (BM) :—in short grass-grown thickets on gravelly soils ; shrub 60 cm. high ; fruits scarlet-red. On left bank of R. Cutato, 7 May 1906, *Gossweiler* 3896 (BM) :—here and there in open thickets. Cassuango Cuiriri, Oct. 1906, *Gossweiler* 4087 (BM) :—here and there in short thickets.

T. angolensis is unquestionably very closely related to *T. benguellensis* Welw. ex Hiern, differing from it in the suffruticose habit, with stems up to 30–90 cm. h., and the linear-lanceolate to linear-oblanceolate leaves up to 1·3 (–1·5) cm. wide with a more densely pubescent lower surface. *T. benguellensis* is described as from 60–180 cm. high, and it seems improbable both from its range of height and from its appearance in the herbarium

that it is suffruticose. Nevertheless the differences between these two species are not great, and it is just possible that *T. benguellensis* may prove not worth keeping up. For the moment, however, I hesitate to sink it on the evidence. More material of *T. benguellensis* is badly wanted.

There is no collector's evidence about the habit of the type of *T. angolensis*, but the specimen suggests a suffrutex making new growth from the lightly burned stems of last season.

Specimens of *T. angolensis* other than the type show slight variations from the description at the beginning of this note. The leaves range up to 7 cm. long and 1·5 cm. wide, and may be quite densely pubescent beneath, with the pubescence extending over the midrib. The leaves of the Gossweiler specimens are in general narrower than those of the type and *Baum* 334. The corolla-tube seems variable in length, sometimes as long as 7 mm., and I suspect that the corolla-tube may elongate during anthesis, so that the length may depend on the time of day that the specimen was collected or put into press.

J. P. M. Brenan.

Tricalysia (Sect. **Empogona**). Since I revised this group in Kew Bull. **1947,** 53–63 (1947), there are two further species to be added. I am indebted to Dr. Bremekamp for calling my attention to *Empogona filiformi-stipulatum*, and to Prof. Dr. W. Robyns for courteously lending me its type-specimen from the herbarium of the Jardin Botanique de l'État at Brussels.

These two additions make necessary some alteration in the key (*op. cit.*, p. 56). In that part of the key under " Leaves 3–10 × 1·5–4·5 cm. :" starting " Primary lateral nerves of leaves few," replace by the following :—

Primary lateral nerves of leaves few, rather distant, in 4 6 pairs :

Leaves glabrous except for minute puberulence on petiole ; twigs glabrous or only minutely puberulous ; flowers distinctly pedicellate ; ovary glabrous outside ; corolla-lobes (3–) 4–6 mm. long ; network of veins inconspicuous or scarcely visible on lower side of leaves 3. *T. sonderiana* Hiern

Leaves pilose or appressed-pubescent at least on midrib and lateral nerves beneath ; twigs densely and persistently pubescent or pilose ; flowers subsessile ; ovary densely pubescent or pilose outside ; corolla-lobes 2·25–3·5 mm. long :

Young branchlets densely spreading-pilose, hairs exceeding the diameter of the branchlet ; midrib and lateral nerves of leaves beneath long-pilose ; some bracts in the inflorescence normally foliaceous ; calyx-lobes 1·5 mm. long ; corolla-lobes 2·25–2·75 mm. long, acute

1a. *T. filiformi-stipulatum* (De Wild.) Brenan (*vide infra*)

Young branchlets densely but shortly pubescent, hair much shorter than the diameter of the branchlet ; midrib and lateral nerves of leaves beneath appressed-pubescent ; bracts not foliaceous ; calyx-lobes 0·8 mm. long ; corolla-lobes 3·5 mm. long, obtuse

1b. *T. deightonii* Brenan (*vide infra*)

Primary lateral nerves of leaves more numerous etc.

2. *T. ovalifolia* Hiern

1a. **Tricalysia filiformi-stipulata** (*De Wild.*) *Brenan*, comb. nov.

Urophyllum filiformi-stipulatum De Wild., Pl. Bequaert. **3,** 211 (1925) (not volume 4, as cited by Bremekamp, *infra*).

Empogona filiformi-stipulatum (De Wild.) Bremek. in Engl., Bot. Jahrb. **71,** 222 (1940).

Belgian Congo. District forestier central. In virgin forest between Walikale and Lubutu, 12 Jan. 1915, *Bequaert* 6580 (BR, typus) :—shrub with white flowers.

Very distinct from all the other species of the section by the hirsute indumentum. The locality is on the eastern side of the Belgian Congo, and it is interesting that its closest affinity is with the new species from Sierra Leone described below.

The ovules are 3–4 per placenta, in this differing from the uniovulate *T. reflexa* Hutch.

1b. **Tricalysia deightonii** *Brenan*, sp. nov. ; *T. filiformi-stipulatae* (De Wild.) Brenan proxima, ramulis breviter pubescentibus nec patenter hirsutis, pilis quam diametrum ramuli multo brevioribus nec eum superantibus, foliis plerumque latioribus costa et nervis lateralibus subtus breviter pubescentibus nec hirsutis, bracteolis inflorescentiae haud foliaceis nec longe acuminatis, calycis lobis rotundatis brevioribus (0·8 mm. longis) nec oblongis (1·5 mm. longis), corollae lobis aliquantulum longioribus (in *T. filiformi-stipulata* 2·25–2·75 mm. longis) obtusis nec acutis, staminibus paulum longioribus (in *T. filiformi-stipulata* 1·9 mm. longis) facillime distinguenda.

Frutex sempervirens, usque ad 2·1 m. altus. *Ramuli* breviter sed dense pubescentes, graciles, 1–4 mm. crassi, novelli plus minusve compressi, serius cortice brunneo vel purpureo-brunneo hic illic desquamante obtecti, internodiis (1·5–) 2–4 (–5) cm. longis. *Folia* breviter petiolata, petiolo 2–4 mm. longo, more ramulorum vestito ; lamina papyracea, oblongo-elliptica usque leviter obovato-elliptica, apice breviter et obtuse acuminata acumine 0·3–0·8 mm. longo, basi late cuneata vel leviter rotundata (1·8–) 3–7 (–9) cm. longa (1·2–) 2·4 cm. lata, siccitate viridia opaca vel vix nitidula, supra costa et nervis lateralibus inconspicue puberulis utrinque cum rete venularum prominulis exceptis glabra, subtus in costa et nervis lateralibus breviter atque appresse pubescens et inter eos pilis appressis minimis nonnisi sub lente cernendis hic illic inspersis ; stipulae satis persistentes, in vaginam 0·5–1 mm. longam extra more ramulorum vestitam intus imo basi piloso excepto glabram acuminibus duobus filiformibus 4–6 mm. longis coronatam cohaerentes. *Inflorescentiae* axillares, sessiles vel subsessiles, cymosae, (1 (abortione, rarissime)-) 2–6-florae, floribus sessilibus vel subsessilibus ; bracteolae minutae, 0·5–1 mm. longae, breviter pubescentes, oppositae, basi connatae sed haud calyculiformes. *Calycis lobi* 4–5, rotundatae, apice obtusae, 0·8 mm. longae, basi 1 mm. latae, extra minute pubescentes. *Ovarium* ovoideo-obconicum, extra dense appresse-pubescens, 1·25 mm. longum, 1·5 mm. latum, biloculare, ovulis pro loculo 2–3. *Corolla* alba, tubo 4 mm. longo basi 1 mm. diametro sursum ad 2 mm. ampliato, extra glabro intus piloso ore dense ac longe barbato, lobis 4–5 reflexis ellipticis usque ellipticooblongis apice obtusis et ibi versus minute erosis et ciliolatis 3·5 mm.

longis 1·6–2 mm. latis utrinque glabris. *Stamina* 4–5, exserta, subsessilia, filamentis brevissimis, antheris 2·5 mm. longis apice 0·7–0·9 longe appendiculatis. *Stylus* 7 mm. longus, glaber, apice bifidus, lobis 1–1·2 mm. longis. *Fructus* (nondum maturus) globosus, circiter 4 mm. diametro, extra sparse pubescens, calyce persistenti coronatus, albus (teste *Deighton* 4723) ; semina brunnea, circiter 2·5 × 2 mm.

Sierra Leone. Southern Province, Moyamba District (Kowa Chiefdom) : Jama, 19 Dec. 1947, *Deighton* 4692 :—shrub 1·2 m. high ; white flowers with faint fragrance of *Citrus*. Jama (same locality as 4692), 10 Mar. 1948, *Deighton* 4723 (K, typus) :—shrub 1·5 m. high ; flowers white ; fruit smooth, white. Kenema District (Koya Chiefdom) : Nyandehun, 4 Apr. 1939, *Deighton* 3659 :—1 m. high : vernacular name (Mende) " Poodai ". Nyandehun, 12 Dec. 1939, *Deighton* 3804 :—shrub 0·6–1 m. high ; white flowers falling readily ; bark boiled and decoction drunk by children for worms : vernacular name (Mende) " Kpoli-wuli ". Southern Province, Kenema District (Nomo Chiefdom) : Near Faiama, 24 Jan. 1940, *Deighton* 3873 :—bush 2·1 m. high, in forest ; flowers white.

For the differences between this and *T. filiformi-stipulata* (De Wild.) Brenan, see the key above. Like *T. filiformi-stipulata* this differs from *T. reflexa* Hutch. in having 2–3 ovules per placenta.

5. **Tricalysia allenii** (*Stapf*) *Brenan* var. **kirkii** (*Hook. f.*) *Brenan* ; Brenan in Kew Bull. **1947,** 61 (1947).

In view of the comments in my previous paper (*op. cit.*, p. 62–3) the presence of a sheet of typical var. *kirkii* from the Transvaal seems worth recording :—

Transvaal. Zoutpansberg District : Zoutpan, *without date or collector* (K, ex P).

J. P. M. Brenan.

Tricalysia jasminiflora (*Klotzsch*) *Benth. et Hook. f. ex Hiern* var. **hypotephros** *Brenan*, var. nov. ; a typo distinguitur foliis subtus dense griseo-tomentosis late ovato-ellipticis usque ad 9–11 cm. longis 4–5 cm. latis costa nervis lateralibus venulisque supra impressis itaque bullatis.

Portuguese East Africa. Quelimane District : Lugela-Mocuba area, Namagoa estate, Sept., *Mrs. H. Faulkner* 81 (*Pretoria No.*) (K, typus varietatis) :—a bush, never very large, common in open forest ; the flowers very often appear before the leaves. Same locality, Nov., *Mrs. H. Faulkner* 81 (*Pretoria No.*).

Although very distinct from normal *T. jasminiflora* in its foliage, it is connected by *Buchanan* 1631 from Nyasaland which has narrow leaves almost as tomentose beneath as Mrs. Faulkner's specimens. The calyx and corolla of the latter are typical.

J. P. M. Brenan.

Neopentanisia *Verdcourt*, gen. nov. ; inter genera ad tribum *Hedyotidearum* hodie relata affinis *Pentanisiae* Harvey, habitu annua, fructu bilobo, lobis globulosis papillatis differt.

Herbae pusillae, annuae. Folia subsessilia, glabra. Vagina stipularis in lobulos subulatos divisa. Flores dimorphi, hermaphroditi, pentameri,

in capitula vel spicas terminales dispositi. Calycis lobi circiter 5, 1–2 foliacei parvi, ceteri minutissimi. Corollae tubus gracilis, filiformis, fauce dense villosus ; lobi oblongo-ovati, aestivatione valvati. Stamina in flore dolichostylo inclusa, in flore brachystylo exserta. Ovarium biloculare, ovulis solitariis pendulis. Fructus bilobus, haud rostratus, lobis globulosis indehiscentibus valde papillatis.

Genus in Angola endemicum. Species 2.

Generis typus :—*Pentanisia annua* K. Schum.

Key to the Species of Neopentanisia.

Plant an acaulescent herb c. 3 cm. high. Inflorescence congested in fruit *annua*

Plant caulescent. Inflorescence spicate in fruit *gossweileri*

Neopentanisia annua (*K. Schum.*) *Verdcourt*, comb. nov.

Pentanisia annua K. Schum. in Warb., Kunene-Sambesi Exped. 385 (1903).

Angola. Am Longa bei Minnesera, 1200 m., 20 Jan. 1900, *Baum* 659 (Typus, K !, W !, COI !, BM !) (the duplicates all bear the same information but the description gives the locality as " oberhalb des Lazingua 1250 m."). Ganguellas, Luassingua, T'Chirondangambe, 19 Jan. 1901, *Gossweiler* 2556 (COI !) The sheet of this number at the British Museum (Natural History) is quite untypical, a rather coarse, densely branched plant, 75 cm. high. More information about this form is required. *Gossweiler* 3783 (BM) also represents this species.

Neopentanisia gossweileri *Verdcourt*, sp. nov. ; affinis *N. annuae* (K. Schum.) Verdcourt, habitu caulescente, inflorescentia demum spicata valde distincta.

Herba annua, erecta, parce ramosa, ad 11·5 cm. alta. *Radix* simplex, circa 4·5 cm. longa. *Caules* graciles, brevissime et bifarie pubescentes. *Internodia* 0·8–4 cm. longa. *Vagina* stipularis 0·5 mm. longa, in lobulos subulatos 3–5 exiens. *Folia* opposita, glabra, subsessilia ; lamina elliptico-lanceolata, apice acuta, basi cuneata, 12–19 × 1·5–4 mm. longa et lata ; costa supra leviter impressa, subtus prominula ; nervi laterales ± 4, difficiliter distinguendi vel obsoleti. *Flores* geminati, dimorphi, ± 12 in capitulis conferti, demum in spicis ad 3·5 cm. longi dispositi. *Calycis tubus* papillatus ; lobi 3–5 , lobi foliacei 2, 0·7–1·5 mm. longi, ceteri minuti vel obsoleti. *Ovula* elliptica, pendula. *Flos microstylus*: *Corollae tubus* gracilis, 10·5 mm. longus, extra glaber, superne haud ampliatus. *Stamina* sub fauce inserta, filamentis ad 1 mm. exsertis, antheris ellipticis ± 0·6 mm. longis. *Flos macrostylus* : *Corollae tubus* 9 mm. longus, 0·25 mm. latus, extra glaber, in parte nona supera modice ampliatus, ± 1 mm. latus, ostio pilis farcto ; lobi 5, 3 mm. longi et 0·5 mm. lati. *Stylus* exsertus, in stigma bilobum divisus. *Fructus* 3 mm. latus, 1·5 mm. altus, bilobus, lobis globulosis valde papillatis.

Angola. Lunda, between Cacolo and Vila Henrique de Carvalho, in subxerophytic forest, 1100–1300 m., 11 Apr. 1937, *Exell & Mendonça*

515 (BM) :—flower white. Mona Quimundo, Cacolo-Saurimo prox. fl. Luvo 1000 m., Apr. 1937, *Gossweiler* 11822 (K, typus) :—corolla white.

Although it is often inadvisable to describe a new species from two single sheets even though good, this present species is so distinct and its affinities so clear that it is best described without further delay. It is quite identical in actual fruit shape with the type of the genus, *N. annua*, but they are arranged in a spike, the distance between the lower pairs being ± 4 mm.

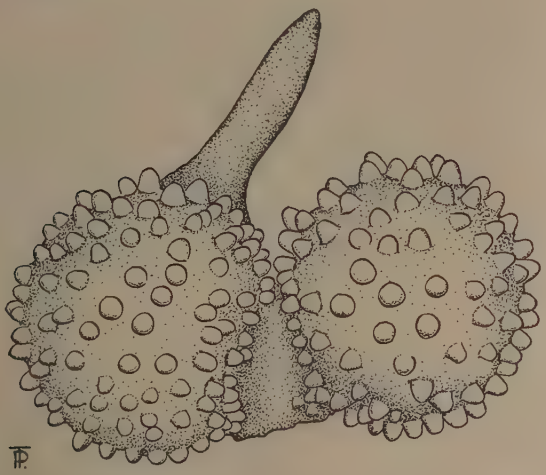


FIG. 4. Fruit of *Neopentanisia gossweileri* Verdcourt, showing persistent calyx-lobe, × 30.

This new genus is strikingly like *Pentanisia* in its flower but differs in its curious fruit and annual habit. Of the genus *Pentonisia* only one annual species is so far known—*Pentanisia parviflora* Stapf ex Verdcourt. That has a fruit similar to other *Pentanisiae* in many respects and is quite distinct from *Neopentanisia*. The latter has a fruit which may be described as resembling half a *Cynoglossum* fruit, two spheres cohering and covered with wart-like papillae. Only one half of the fruit carries calyx lobes. A fruit of *N. gossweileri* is figured (fig. 4).

B. VERDCOURT.

Coffea ebracteolata (*Hiern*) *Brenan*, comb. nov.

Psilanthus ebracteolatus Hiern in Oliv., Fl. Trop. Afr. **3,** 186 (1877) ; Hutch. & Dalz., Fl. W. Trop. Afr. **2,** 92 (1931) ; A. Chev., Les Caféiers du Globe **2** (Iconographie) t. 135 (1942) ; *op. cit.*, **3,** 226 (1947).

Cofeanthus ebracteolatus (Hiern) A. Chev., Les Caféiers du Globe, **3,** 226 (1947), *gen. et comb. nov. provisorium.*

Fully mature fruits of *Psilanthus ebracteolatus* have not been until now sent to Kew. Recently, Mr. F. C. Deighton, Plant Pathologist, Department of Agriculture, Sierra Leone has, in response to my request, kindly sent a fine collection of the ripe fruits, dried and in spirit (Njala, Nov. 1951, *Deighton* 5659). These fruits are obcordate or quadrate, often rather broader than long, bilobed and black and shining when fully ripe

according to Mr. Deighton ; except for the furrow separating the lobes they are quite smooth outside, and the calyx is scarcely visible at all.

These fruits are utterly different from those of *Psilanthus mannii* Hook. f. the type of the genus *Psilanthus*, whose fruits have 5 narrow longitudinal wings on the outside and are crowned by 5 large, accrescent foliaceous sepals. *P. ebracteolatus* is thus certainly not congeneric.

I am unable to see any reason against *P. ebracteolatus* being a *Coffea*, the fruits and seeds in particular showing very good agreement. The seeds of *P. ebracteolatus* when roasted smell distinctly of coffee.

On account of the terminal flowers and seeds with a longitudinal furrow on the ventral side, it must presumably be placed in Sect. *Paracoffea* (see A. Chevalier, *op. cit. supra*, **2,** 24 (1942). If it be placed here, a strong and distinct similarity to *Coffea ebracteolata* is shown by *C. travancorensis* Wight et Arn. The Section *Paracoffea* has been recorded previously from Asia and Madagascar, but *C. ebracteolata* is its first species native to continental Africa. *Coffea melanocarpa* Welw. ex Hiern among the African species is very similar to *C. ebracteolata* in facies, but differs in the more puberulous young shoots, the normally lateral flowers, and the larger corolla whose tube is puberulous not glabrous outside.

J. P. M. Brenan.

Borreria phyteuma (*Schweinf. ex Hiern*) *Dandy* in F. W. Andr., Flow. Pl. Anglo-Egypt. Sudan, **2,** 426 (1952).

Spermacoce phyteuma Schweinf. ex Hiern in Oliv., Fl. Trop. Afr. **3,** 235 (1877) ; Broun & Massey, Fl. Sudan, 272 (1929).

J. E. Dandy.

Compositae

Vernonia (Sect. *Strobocalyx*) **titanophylla** *Brenan*, sp. nov. ; a *V. frondosa* Oliv. et Hiern, cui proxima, praesertim capitulis multo minoribus, involucri foliolis multo angustioribus, bracteis basi inflorescentiae ramorum multo minoribus et adeo eis basi capitulorum ut videtur obsoletis facillime distinguenda ; insuper foliis supra magis setuloso-hispidis, pappo necnon tubo corollae brevioribus verosimiliter diversa.

De *habitu* adhuc inquirenda, sed per analogiam speciebus affinibus probabiliter arborescens. *Caulis*, perjuvenilis tantum visus, pilis mollibus patentibus siccitate dilute brunneis densissime vestitus. *Folia* ingentia, sessilia vel vix petiolata, papyracea, obovato-lanceolata, apice acuta vel subacuta, basi sensim attenuata et imo basi laciniata, laciniis 0·5–2·5 cm. altis, plerumque ultra 30 cm. longa et 9 cm. lata, et 70 cm. longa et 25 cm. lata tenus, supra siccitate atrobrunnea opaca primo dense setuloso-hispida serius plus minusve calvescens, subtus tomentosa, margine subgrosse et inaequaliter dentata dentibus majoribus circiter 3–10 mm. altis et inter se 1–5 cm. distantibus eisdem denticulos minimos pubescentes ferentibus, nervis lateralibus numerosis late patentibus marginem versus furcatis supra inconspicuis vel pilis numerosioribus notatis subtus prominentibus rete venularum subtus prominulo conjunctis. *Inflorescentiae*, cujus fragmenta tantum adhuc visa, haud dubie gigantea, paniculata, axibus ad 13 mm. vel ultra diametro omnibus

densissime tomentosis, ramis lateralibus ad 40 cm. longis, ramulis ultimis plus minusve elongatis capitula solitaria vel aliquot (ad 6) glomerata sessilia spicatim et plus minusve interruptim ferentibus ; bracteae ramos inflorescentiae suffulcientes lanceolatae, usque ad 7 mm. longae, eae capitulorum ut videtur obsoletae. *Capitula* circiter 40-flora, campanulata ; involucrum 0·9–1·2 cm. longum, apice 0·7–1 cm. latum, foliolis scariosis satis rigidis apice acutis vel subacutis saturate brunneis inferne stramineis, extimis extra tomentosis late ovatis circiter 1·8 mm. longis 1·2 mm. latis, interioribus glabrescentibus ovato-oblongis ad 3–4·5 mm. longis 2 mm. latis, intimis linearibus ad 9–11 mm. longis 1 mm. latis. *Flores* tubulosi tubo 6·5–8 mm. longo, basi 0·3 mm. apice 1 mm. diametro, 5-lobato, lobis triangularibus acutis 1·5 mm. longis 0·5 mm. latis reflexis ; antherae 3 mm. longae ; stylus 9 mm. longus, inferne glaber, superne pubescens, apice in ramos 2 circiter 1 mm. longos divisus. *Achaenia* subcylindrica, glabra, brunnea, 7–8-costata, 1·5–2 mm. longa, 0·5–0·6 mm. lata apice pappi setis uniseriatis albidis 6–8 mm. longis coronatum, squamis nullis.

French Cameroons. Yaounde (Yaunde) 1894–95, *Zenker* 275. Same locality, 1895, *Zenker & Staudt* 651.

Spanish Guinea. Mabungo, Nkolentangan, alt. 450 m., 17 Jan. 1908, *Tessmann* 122 :—flowers rosy : vernacular name " abanjak mindsang ".

Belgian Congo. Forest of the Urega, 1932, *Lebrun* 5800 (K, typus).

V. titanophylla belongs to a very easily recognised group of species within § *Strobocalyx*, shrubs or trees with gigantic leaves mostly 30 cm. or more long and capitula arranged spicately or racemosely along the ± elongate ultimate branches of the inflorescence. Besides *V. titanophylla*, there are *V. conferta* Benth. and *V. frondosa* Oliv. et Hiern.

The following key will enable these species to be separated :—

Leaves distinctly petiolate, petiole about 1–12 cm. long ; lamina not laciniate at extreme base ; capitula small, stalked or subsessile, without a conspicuously enlarged bract at their base ; involucre 6–8 mm. long *V. conferta* Benth.

Leaves sessile or almost so ; lamina ± laciniate at extreme base ; capitula sessile ; involucre more than 9 mm. long :

Involucre 9–12 mm. long, median and inner scales narrow, 1–2 mm. wide ; pappus 6–8 mm. long ; capitula without any conspicuously enlarged bract at their base . *V. titanophylla* Brenan

Involucre 20–25 mm. long, median and inner scales broader, 3–4 mm. wide ; pappus 10–17 mm. long ; each capitulum with a conspicuously enlarged tomentose bract 1 cm. long or more at its base *V. frondosa* Oliv. et Hiern

Of the other species described near these three in the Flora of Tropical Africa, **3,** 294–5 (1877), *V. doniana* DC. may be related to *V. conferta*, from which it differs in the leaves, but the material I have seen is insufficient for me to decide ; while *V. theophrastifolia* Schweinf. ex Oliv., et Hiern is very close to and perhaps conspecific with *V. richardiana* Pic.-Ser. (*V. myriocephala* A. Rich., non DC.)

J. P. M. Brenan.

Eleutheranthera ruderalis (*Sw.*) *Sch. Bip.* in Bot. Zeit. **24,** 165 (1866). *Melampodium*? *ruderale* Sw., Fl. Ind. Occ. **3,** 1372 (1806).

Sierra Leone. Bombali District. Near Roruks, July 1936, *Deighton* 3257. Without locality, 1914–15, *N. W. Thomas*, 8293, 9885, 10438.

Nigeria. Lagos, 1920, *Dalziel* 1352 :—a common weed.

This inconspicuous annual weed, widely distributed through Tropical America, Asia and Australasia, has not hitherto been recorded, so far as I can trace, from the African mainland, though the above records show that it has been present there since 1914 or earlier, misidentified with *Eclipta prostrata* (L.) L. (*E. alba* (L.) Hassk.) and consequently overlooked. Dr. Dalziel's note hints that the plant may be much more common, at least in some districts, than the number of records would suggest. Such inelegant weeds are easily ignored by the collector, and it is possible that *Eleutheranthera* may have been passed unnoticed in many areas.

Eleutheranthera ruderalis is readily distinguished from *Eclipta prostrata* by its very short peduncles, few-flowered, rayless capitula, and conspicuous, ciliate receptacular scales. These characters will also serve to distinguish it from other African genera of the subtribe *Verbesineae* to which it belongs.

I am indebted to Mr. N. Y. Sandwith for aid in identifing the specimens cited above, and to Mr. J. P. M. Brenan for drawing my attention to a very interesting article by Dr. A. Lawalrée (*Bull. Jard. Bot. Brux.*, **17,** 55 : 1943) on the genera *Hoffmaniella*, *Eleutheranthera* and *Exomiocarpon*.

R. D. Meikle.

Pedaliaceae

Sesamum (Sect. *Sesamotypus*) **latifolium** *Gillett* sp. nov. ; a congeneribus foliis inferioribus magnis trilobatis serratis cordatis distinctum.

Herba erecta, c. 1·2 m. alta. *Caulis* quadrangulatus, sulcatus, pilis glanduliferis in sicco plus minusve brunneis 0·2 mm. longis erectis dense obtectus. *Folia* opposita, inferiora longe (usque ad 20 cm.) petiolata, petiolo sulcato dense pubescenti, late ovata, ad medium trilobata, margine crasse serrata, apice breviter acuminata, basi cordata, c. 13 cm. longa, 18 cm. lata, utrinque sparse, et subtus ad nervos dense, pubescentia ; superiora multo minora, haud lobata, ovata, serrata, cordata, acute acuminata ; suprema in bracteas transeuntia. *Bracteae* lanceolatae serratae, petiolatae, basi plus minusve attenuatae. *Flores* in axillis solitarii. *Pedicellus* pubescens, florens 1·5 mm. longus, fructifer ad 3 mm. longus, basi bracteolas duas anguste lanceolatas c. 5 mm. longas in quarum axillis nectaria rubra sessilia gemmiformia ferens. *Calyx* pubescens, fere ad basin 5-partitus, lobis anguste lanceolatis uncinatis inaequalibus ; lobus superior c. 4 mm. longus, 1 mm. latus, laterales c. 6 mm. longi, 1·3 mm. lati, inferiores 6 mm. longi 1·9 mm. lati. *Corolla* pallide rosea, extra breviter glanduloso-pubescens, tubo curvato, c. 4 mm. ex basi ad 4 mm. latitudine constricto, deinde auguste campanulato, ad oram 1·3 cm. lato, in toto 2·5 cm. longo ; lobus anticus basi angustatus, late ovatus, subacutus, 9 mm. latus, 7 mm. longus ; lobi posteriores in labium superius latum truncatum 3 mm. longum coaliti ; lobi laterales late rotundati, 2 mm. longi. *Stamina* in parte constricta corollae inserta, filamentis glabris, anticis 15 mm. posticis 19 mm. longis, antheris conniventibus 3·5 mm. longis, filamentis medio

in dorso insertis apice glandulam atropurpuream conspicuam ferentibus. *Discus* annularis, glaber, brevis. *Ovarium* adpresse pubescens, oblongum, 6 mm. longum, in stylum attenuatum. *Stylus* glaber, 1·6 cm. longus, apice in stigmata duos linearia inaequalia partitus, quorum unum 4 mm. longum alterum 0·5 mm. longius et paulo angustius. *Capsula* erecta, breviter et dense pubescens, oblonga, quadrangulo-sulcata, ·23 mm. longa, 5 mm. lata, apice in rostrum acuminatum 5 mm. longum attenuata, basi inaequalis, latere propius cauli attenuata, latere a caule averso abrupte et rectangulo truncata. *Semina* obovata, complanata, 3 mm. longa, 2 mm. lata, 0·5 mm. crassa, margine angustissime bialata, utrinque et margine inter alis eleganter foveolata, foveolis exterioribus quam interiores multo majoribus.

Uganda. Karamoja District. Labwor, on rocks, 1200 m., 4 June 1940, *A. S. Thomas* 3708 (K, typus) :—locally frequent, native name Nakanyim.

Kenya. Lake Rudolf. *Capt. M. S. Wellby.*

Sudan or Abyssinia. Near Blue Nile, 1837–38, *Kotschy Pl. Aethiop.* 320 (a fruiting specimen without the lower leaves, placed in this species with some doubt).

J. B. Gillett.

Acanthaceae

Asystasia somalensis (*Franch.*) *Gillett*, comb. nov.

Barleria somalensis Franch., Sert. Somal. 51 (1882).

Parasystasia somalensis Baill., Hist. Pl. **10,** 461 (1891) ; Lindau in Engl. & Prantl, Pflanzenfam. **4, 3B,** 325 (1895) and in Ann. Ist. Bot. Roma **6,** 78 (1896).

Asystasia coleae Rolfe in Kew Bull. **1895,** 223 (1895) ; C. B. Clarke in Thiselton-Dyer, Fl. Trop. Afr. **5,** 135 (1899) ; Glover, Check List of British and Italian Somaliland Trees, Shrubs and Herbs 59 (1947).

A. somalica Gandoger in Bull. Soc. Bot. Fr. **61,** 349 (1922) is a different species.

J. B. Gillett.

Lepidagathis collina (*Endl.*) *Milne-Redh.*, comb. nov.

Russegera collina Endl., Iconogr. Gen. Pl. t. 94 (1838), et Nov. Stirp. 38 (1839).

Lepidagathis radicalis Nees in DC., Prodr. **11,** 255 (1847).

In the Flora of Tropical Africa **5,** 123 : 1899, C. B. Clarke followed Nees in using the epithet *radicalis* for this plant. The new combination here made is required for inclusion in The Flowering Plants of the Anglo-Egyptian Sudan now being written by Dr. F. W. Andrews.

E. Milne-Redhead.

Verbenaceae

Clerodendrum involucratum *Vatke* in Linnaea **43,** 537 (1880–2).

Dirichletia involucratum Baker in Journ. Linn. Soc., Bot. **22,** 482 (1887).

D. sphaerocephala Baker in Journ. Linn. Soc., Bot. **25,** 321 (1890).

Whilst systematically looking through the *Rubiaceae* at Kew two sheets were found in the Madagascar covers of the genus *Dirichletia* which were

obviously referable to the *Verbenaceae*. They both matched a common species of *Clerodendrum* and the full synonymy is given above. The first Baker species mentioned is not a transfer of Vatke's species but an entirely new name.

B. VERDCOURT.

LILIACEAE

Chlorophytum arcuatoramosum *R. B. Drummond*, sp. nov. ; species insignis, non demonstrans, ut videtur, aliis africanis affinitatem manifestam, sed foliis ensiformibus ciliatisque, ramis arcuatis, habitu elato distinguenda.

Herba perennis, usque 3 m. alta, caudice radicibus cylindricis. *Folia basalia* ensiformia, 6 (-10) cm. lata et 120 cm. longa, in petiolos alatos circiter 20 cm. longos angustata, mediam costam manifestam et utrinque circiter 20 venas parallelas habentia, marginibus ciliatis excludendis glabra. *Pedunculus* laevis, glaber, usque 1 cm. crassus. *Inflorescentia* patentim ramosa, usque 30 cm. longa ; rami laeves glabri, usque 3 mm. crassi, arcuati, superne dense racemosi inferne sine floribus. *Pedicelli* 1–3 nati, floriferi circiter 2·5 mm., fructiferi maturi 6·5 mm. longi, apice ipso articulati, hinc persistentes. *Bracteae* ciliatae, inferiores ad 11 cm. longae, lineari-lanceolatae aut lineares, superiores multo minores. *Perianthii* segmenta libera, alba, 9 mm. lata, trinervia ; 3 exteriora cucullata, extra papillosa, ad apice minute ciliata et intus ad basim barbata ; 3 interiora apice haud cucullata, extra nec ciliis nec papillis ornata, intus ad basim barbata. *Filamenta* alba, filiformia, in alabastro 7–8 mm. longa inclusa, sub anthesi 9 10 mm. longa exserta. *Antherae* 2·5–3 mm. longae. *Ovarium* 3 mm. longum, diametro 2·5 mm., 3-lobatum ; stylus subcylindricus, circiter 5 mm. longus stigmate parvo ornatus ; ovula in utroque loculo circiter 10. *Capsula* valde 3-lobata, apice emarginata, basi truncata, 8–10 mm. longa, 7–8 mm. diametro ; lobi oblongi, olivaceo-virides, 4 mm. lati, nervis transversis praedita. *Semina* 7–8 pro loculo, verticaliter instructa, lamelliformia, orbicularia, basi cordata, 4·5 mm. longa, 5 mm. lata, testa nigra verruculis 40 μ diametro praedita.

BELGIAN CONGO. Province du Kasai. District de Kabinda. Selemo Farm, Kisamba, Jan. 1931, *Quarré* 2350 (BR) :—plant 1·8–2·2 m. high ; stem hard ; leaves 1 m. long, green, ribbonlike ; flowers white. Lusuku (Société Sacomintra), Dec. 1930, *Quarré* 2259 (BR) :—plant 2·5 m. high ; stem green, hard, shiny ; leaves green, sheathing ; flowers white. Mutuy, Feb. 1931, *Quarré* 2465 (Typus, BR) :—plant 2·3 m. high ; stem green, cylindrical, glabrous ; basal leaves in a rosette, ribbonlike with a strong median nerve, some clasping the stem. Kaniama, wooded savannah, 900 m., 12 Apr. 1947, *W. Mullenders* 142 (BR) :—2–3 m. high with a large rhizome ; basal leaves 1 m. long, 10 cm. wide, linear ; flowers white.

This striking species, at present known only from a very restricted area in the Belgian Congo, does not show any very clearly defined relationship with any other species of *Chlorophytum* represented in the Herbaria at Kew, Brussels and the British Museum (Natural History). It can be recognised by its characteristic long ensiform ciliate leaves, pedicels articulate at the very apex, and arcuate branches.

R. B. DRUMMOND.

RHIZOPHORA IN WEST AFRICA.

R. W. J. Keay.

Research by H. J. Savory of the University College, Ibadan, Nigeria, in 1949–51, into the ecology, anatomy and physiology of species of *Rhizophora* Linn. occurring near Lagos has revealed the presence of three species of the genus in West Africa, instead of the one—*R. racemosa* G. F. W. Meyer—hitherto recorded by almost every author. Savory's work has since been confirmed by a good range of specimens from other countries.

The three species—*R. mangle* Linn., *R. racemosa* G. F. W. Meyer, and *R. harrisonii* Leechman—are found in the West African mangrove swamps from Senegal to Angola. In many localities all three species are known to occur and are reported by Savory and other observant workers to be easily distinguishable in the field and to exhibit somewhat different ecological preferences. My knowledge of *Rhizophora* in the field is extremely limited, so I am omitting from this note any reference to ecology. It is hoped that some of the interesting and economically important ecological information which has been obtained by other workers will be published by them shortly.

R. mangle Linn. has been recorded from West Africa by several of the earlier botanists (e.g. Oliver in F.T.A. 2 : 408), but in the Flora of West Tropical Africa (1927) these records are rejected, and only *R. racemosa* G. F. W. Meyer is recorded. Some of the earlier specimens are admittedly poor, but the more recent material makes it quite clear that *R. mangle*, precisely similar to the American material, does in fact occur along the western coast of Africa.

R. racemosa G. F. W. Meyer and *R. harrisonii* Leechman have been confused by many botanists. Leechman's paper (Kew Bull. 1918 : 6) is however most interesting and important for in it he described the three species he knew personally in British Guiana near Georgetown at the estuary of the Essequibo River, the type locality for *R. racemosa*. After describing *R. mangle*, Leechman then discussed the other two species, either of which might have proved to be *R. racemosa* G. F. W. Meyer, in the interpretation of which he received valuable advice and guidance from Dr. Stapf of Kew. This interpretation of *R. racemosa* is proved correct by a recent examination of Meyer's type, and it appears that *R. harrisonii* Leechman is the earliest name for the other species.

The interesting fact now emerges, that all the three species described by Leechman occur on the African shores of the Atlantic as well as on the American shores. *R. racemosa* is however the most frequent species on the African coast, but the least frequent on the American side of the ocean.

Many botanists have included all these three species in *R. mangle* Linn. but the recent evidence indicates clearly that this view is incorrect. The references in literature to these species in the American continent and islands are however so numerous and frequently confused that I have not attempted to interpret and cite all the references.

The three species (see Fig. 1) may be distinguished as follows :—



FIG. 1. *Rhizophora racemosa* G. F. W. Meyer—A : leafy shoot and inflorescence, × ⅛. A1 : flower bud, × 4. A2 : open flower, × 4. A3 : stamen, × 8. A4 : fruit and radicle, × ⅛. A is drawn from *Warnecke* 58 ; A1-4 from *Savory* UCI. 69.
Rhizophora harrisonii Leechman—B : inflorescence, × ⅛. B1 : flower bud, × 4 Drawn from *Savory* UCI. 70.
Rhizophora mangle Linn.—C : inflorescence, × ⅛. C1 : flower bud, × 4. Drawn from *Savory* UCI. 71.

Pedicels 6–15 mm. long, relatively slender ; buds acute at apex ; sepals 10–13 mm. long, 2·5–3·5 mm. broad ; radicle seldom exceeding 20 cm. long while still on the tree :

Inflorescence normally 2-flowered (rarely 3–4) ; peduncle 3–4 cm. long, pedicels 10–15 mm. long ; bracts obtuse ; pericarp 2–2·5 cm. long ; flowers sweet-scented, sepals greenish-yellow, midrib straw coloured when fresh 1. *mangle*

Inflorescence much-branched and many-flowered, 7–12 cm. long, lax with slender branches ; peduncle 3·5–8 cm. long ; pedicels 6–10 mm. long ; bracts more or less acute and spreading ; pericarp about 3·5 cm. long ; sepals greenish-yellow, midrib reddish when fresh 2. *harrisonii*

Pedicels 3–4 mm. long, stout ; buds obtuse at apex ; sepals 8–11 mm. long, 3–4·5 mm. broad, greenish ; pericarp 3·5–5 cm. long ; radicle attaining 30–65 cm. long while still on the tree ; inflorescence much-branched, several to many-flowered, 5–7 cm. long ; peduncle 1·5–4 cm. long, branches relatively short and stout, flowers rather crowded ; bracts obtuse ; midrib reddish when fresh . 3. *racemosa*

Note :—dark cork warts may sometimes be seen on the under-surface of the leaves in specimens of all three species. They seem to be more frequently obvious in *R. mangle*, and are said to be diagnostic in the field.

1. R. mangle *Linn.* Sp. Pl. **1** : 443 (1753), pro parte, excl. syn. Asiat. ; Linn. Sp. Pl. Ed. 2, **1** : 634 (1762) ; Jacquin Select. Stirp. Amer. Hist. 141, t. 89 (1763) ; Oliver in F.T.A. **2** : 408 (1871) ; Leechman in Kew Bull. **1918** : 4 (1918) ; A. Chev. Explor. Bot. 255 (1920) ; Salvoza in Nat. et Appl. Sci. Bull. Univ. Philipp. **5** : 224 (1936).

[*R. mangle* Linn. var. *racemosa* (non Engl.)—Hiern in Cat. Welw. **1** : 333 (1896)].

Mangle pyri foliis, cum siliquis longis, sicui indicae affinis Sloane Cat. Pl. Jam. 155 (1696) ; Nat. Hist. Jam. **2** : 63 (1725).

Mangles aquatica, foliis subrotundatis et punctatis Plumier Nov. Pl. Ann. Gen. 13, t. 15 (1703).

Type : Jamaica, *Sloane* s.n. (Herb. Sloane vi : 62, in BM, lectotype !)

I have seen the following specimens from Africa :—

Senegal : River Salum, *Brunner* 102 (K ; BM). Casamance (fl. Jan.) *Chevalier* 3007 (P ; K) ; 3008 (P).

French Guinea : Tristao Island, *Paroisse* 18 (P).

Sierra Leone : Lumley (fl. & fr. June & Oct.) *Tindall* 1 (K) ; 7 (K). Mapotolon, Samu (fl. & fr. June & Sept.) *Adames* 230 (K) ; 247 (K).

Nigeria : Igboshere, Lagos (fr. May) *Savory* UCI. 704 (K). Five Cowrie Creek, Lagos (fl. & fr. Nov.) *Savory* UCI. 71 (K). Eket, *Talbot* 3097 (BM).

Angola : R. Loge, Ambriz (fl. Nov.) *Welwitch* 2497 (BM). Praia, Luanda (fl. & fr. July) *Welwitch* 2496 (BM ; K ; P). Luanda, *Gossweiler* 164 (BM ; K ; P).

Linnaeus included both Asian (from Malabar) and American (from the Caribbean) mangroves in his *R. mangle* and it is clear that his concept

included at least two taxa which are now generally agreed to be distinct species. In the second edition of the Species Plantarum (1762) Linnaeus attached to his diagnosis of *R. mangle* a reference to t. 89 in Jacquin Select. Stirp. Amer. Hist. (1763). This reference restricts *R. mangle* to the American plant which has been interpreted as *R. mangle* Linn. *pro parte*, *sensu stricto* in this paper.

There are two specimens named *Rhizophora mangle* by Linnaeus in the Linnean Herbarium. One of the specimens, which bears the name " Cajucatakka ", is an Asiatic species *R. mucronata*. The other specimen consists of a leafy shoot with a very young inflorescence, a detached fruit, and a detached portion of an inflorescence bearing old flowers. The leafy shoot and the fruit cannot be identified with certainty but are quite possibly *R. mangle* Linn. *sensu stricto* (i.e. in the sense restricted in the second edition by the reference to Jacquin's plate) ; the detached portion with old flowers is almost certainly *R. racemosa*. According to Daydon Jackson (Index to the Linnean Herbarium, 1912), these specimens were probably not in the Herbarium until after 1755, that is at least two years after the publication of the first edition of the Species Plantarum. Neither of these specimens can therefore be accepted as the type of *R. mangle* Linn.

According to the correspondence between Linnaeus and Jacquin published by Schriebers and Endlicher (Caroli Linnaei Epistolae ad Nicolaum Josephum Jacquin ; Vienna, 1841) Linnaeus received copies of some of the plates of Jacquin's Select. Stirp. Amer. Historia before they were published ; thus Linnaeus mentions them in a letter of 4 July 1762. This probably accounts for the citation by Linnaeus of Jacquin's plate of *Rhizophora mangle* in the second edition of the Species Plantarum published late in 1762, whereas Jacquin's work was published late in 1763. I am very grateful to Mr. W. T. Stearn of the British Museum (Natural History) for supplying this interesting information in response to my enquiry.

There is a good specimen in Sloane's Herbarium, preserved in the British Museum, of the plant (*Mangle pyri foliis* etc.) referred to by Sloane in his two works which were cited by Linnaeus. This specimen is undoubtedly the species described and illustrated by Jacquin, which I interpret here as *R. mangle* Linn. *sensu stricto*. It has, I consider, a good claim to be adopted as the lectotype.

In West Africa *R. mangle* is described as a shrub or small tree, to 5 m. high.

2. R. harrisonii *Leechman* in Kew Bull. **1918** : 8 (1918).

R. racemosa (non G. F. W. Meyer)—mult. auct., pro parte, incl. Hook. f. in Hook. Niger Fl. 341 (1849) quoad spec. *Vogel* ; Oliver in F.T.A. **2** : (1871) quoad spec. *Vogel* ; A. Chev. Explor. Bot. 255 (1920) quoad spec. *Chev.* 3006 ; Hutch. et Dalz. F.W.T.A. **1** : 229 (1927) pro parte ; Salvoza in Nat. et Appl. Sci. Bull. Univ. Philipp. **5** : 210 (1936) excl. spec. *Mann* 492 ; Exell Cat. S. Tomé 174 (1944).

[*R. mangle* (non Linn.)—Hook. f. in Hook. Niger. Fl. 341 (1849) quoad spec. *Don*].

R. mangle Linn. var. *racemosa* Engl. in Mart. Fl. Bras. **12** : 427 (1872), pro parte, non *R. racemosa* G. F. W. Meyer.

Type : British Guiana, seashore near Georgetown, *Leechman* s.n. (K, syntype !).

I have seen the following specimens from Africa :—

Senegal : *Perrottet* 319 (P). Casamance (fl. Jan.) *Chevalier* (P ; K).

Gambia : *Don* (BM). Bitang Creek, *Dawe* 76 (K). Koto (fl. May) *Fox* 105 (K).

French Guinea : *Paroisse* 3 (P). Conakry (fl. May) *Pobéguin* 1174 (P).

Sierra Leone : *T. Vogel* 166 (K). Bonthe, Sherbro Island (fl. Mar.) *Rhind in Hb. Deighton* 5365 (K). Lumley (fl. & fr. June) *Tindall* 4 (K). Mapotolon, Samu (fl. Sept.) *Adames* 248 (K). Yelibana Island (fl. Oct.) *Jordan* 623 (K). Maswari (fl. Oct.) *T. S. Jones* 242 (K).

Liberia : Grand Bassa (fl. July) *T. Vogel* 113 (K).

Nigeria : Lagos (fl. Dec.) *Hagerup* 800 (K ; C). Five Cowrie Creek, Lagos (fl. Nov.) *Savory* UCI. 70 (K).

Sao Tomé : Praia Metao (fl. Sept.) *Moller* 859 (BM ; COI). Littoral region near the town (fl. Oct.) *Exell* 62 (BM ; COI).

Gabon : *Griffon du Bellay* 50 (P). Libreville (fl. Aug.) *Klaine* 767 (P). Cap Lopez (fl. Jan.) *Pobéguin* 162 (P).

Angola : Luanda, *Gossweiler* 433 (BM ; K ; P).

This species has been frequently confused with *R. racemosa* G. F. W. Meyer, but was distinguished by Leechman whose description of the new species was based on rich collections, now preserved at Kew, made by himself in British Guiana near Georgetown on the estuary of the Essequibo River.

Salvoza (1936) in his revision of the genus *Rhizophora* distinguished the two taxa *R. racemosa* G. F. W. Meyer and *R. harrisonii* Leechman but was mistaken in the nomenclature. In the first place he applied the name *R. racemosa* to *R. harrisonii* Leechman and then by some extraordinary means applied the name *R. harrisonii* to *R. racemosa* G. F. W. Meyer. In applying the name *R. racemosa* to the plant described by Leechman as *R. harrisonii*, Salvoza was following several earlier botanists ; the correctness or otherwise of this depends on the identity of G. F. W. Meyer's type of *R. racemosa* which I have recently examined (*vide infra*). Salvoza's other error is however inexplicable, as he was obviously wrong in applying the name *R. harrisonii* to the very plant to which Leechman had restricted the name *R. racemosa* G. F. W. Meyer and from which he distinguished his new species.

In West Africa *R. harrisonii* is described as a shrub or small tree, to 7 m. high. It is reported as fruiting rather poorly, despite the very large number of flowers produced.

3. R. racemosa *G. F. W. Meyer* Primit. Fl. Essequeb. 185 (1818) ; Leechman in Kew Bull. **1918** : 6 (1918) ; De Wild. Pl. Bequaert. **2** : 84 (1923) ; mult. auct., pro parte, incl :—Hook. f. in Hook. Niger Fl. 341 (1849) quoad spec. " *Guinea Coast* ; *Herb. Hook.*" ; Oliver in F.T.A.

2 : 408 (1871) quoad spec. *Barter* ; A. Chev. Explor. Bot. 255 (1920) excl. spec. *Chev.* 3006 ; Hutch. et Dalz. F.W.T.A. **1** : 229 (1927) pro parte ; Salvoza in Nat. et Appl. Sci. Bull. Univ. Philipp. **5** : 210 (1936) quoad spec. *Mann* 492.

[*R. harrisonii* (non Leechman)—Salvoza l.c. 212].

Rhizophora sp.—R. Brown in Tuckey R. Zaire, App. 437 (1818).

Type : British Guiana, Essequibo River, *Herb. G. F. W. Meyer* 228 (GOET, holotype !).

I have seen the following specimens from Africa :—

Senegal : mouth of R. Senegal, *Roger* s.n. (K). Casamance (fl. Jan.) *Chevalier* 3005 (P). M'boro (fl. May) *De Wailly* 4634 (P).

Sierra Leone : Congo Town Bay (fl. & fr. Feb.) *H. H. Johnston* 64 (K) ; 65 (K). Kumbrai (fl. Dec.) *N. W. Thomas* 6907 (K) ; 6950 (K) ; 7085 (K). Tombo (fl. Jan.) *Deighton* 1030 (K). Bonthe, Sherbro Island (fl. & fr. Mar.) *Rhind in Hb. Deighton* 5364 (K).

Liberia : Monrovia, *Whyte* s.n. (K). Sinoe Basin, *Whyte* s.n. (K). Duport (fl. Nov.) *Linder* 1472 (K). Fisherman's Lake (fl. & fr. Dec.) *Baldwin* 10897 (K).

Ivory Coast : Assinie (fl. & fr. Apr.) *Chevalier* 16311 (P ; K). Bingerville (fl. & fr. Feb.) *Chevalier* 17359 (P).

Gold Coast : Axim (fl. July) *Chevalier* 13824 (P). Botchiano, Accra, *Irvine* 1031 (K).

Togoland : Lome, *Warnecke* 58 (K).

Dahomey : (fr. Dec.) *Poisson.* s.n. (P).

Nigeria : Lagos, *Millen* 137 (K). Lagos, *Dawodu* 329 (K : P). Ikorudu (fl. May) *H. N. Thompson* 1 (K). Five Cowrie Creek, Lagos (fl. & fr. Nov.) *Savory* UCI. 69 (K). Lagos (fl. & fr. Aug.) *Oliphant* FHI. 13512 (FHI ; K). Akassa Creek, Brass, *Barter* 1850 (K) ; 2078 (K ; P). Nun River (fr. Sept.) *Mann* 492 (K ; P).

British Cameroons : Tiko (fl. Feb.) *Maitland* 972 (K).

Gabon : Tchibanga (fl. Feb.) *Le Testu* 1000 (P).

French Congo : Mayomba (fl. Jan.) *Lecomte* D. 105 (P). Kouilou, *Sargos* 46 (P).

Cabinda : Landana, Shibango (fr. Aug.) *J. Bequaert* 588 (BR ; K).

Belgian Congo : Banana (July) *Vermoeson* 2584 (BR ; K). Malela, *J. Bequaert* 7918 (BR ; K).

Angola : *Christen Smith* s.n. (K). Sumba, R. Congo (fl. Dec.) *Gossweiler* 8593 (BM) ; 8808 (BM ; K).

This exact identity of G. F. W. Meyer's *R. racemosa* has been in doubt for some time. I have, however, through the courtesy of The Professor, Botanisches Institut, Göttingen, been able to examine the type on loan at Kew. Meyer's specimen from the R. Essequibo bears the number 228, and consists of a leafy shoot with young inflorescences. The flower buds are young, but clearly obtuse, the bracts are obtuse and the pedicels and branches of the inflorescences are relatively stout. The specimen is definitely the species interpreted here and by Leechman as *R. racemosa*. Young inflorescences of *R. racemosa* can be distinguished without much

difficulty from those of *R. harrisonii* at a comparable stage, especially by the obtuse buds and bracts, and stout pedicels and branches of the inflorescence of the former. The young inflorescences of *R. harrisonii* are much more slender and have markedly acute buds and bracts.

In West Africa *R. racemosa* is described as varying in habit from a small bush to a tall tree, 40 m. or so high, with a straight bole.

I am much indebted to several botanists for advice in the preparation of this paper, in particular to Mr. H. J. Savory who first drew attention to the three species in West Africa, and to Mr. R. D. Meikle of the Kew Herbarium who first suggested that *R. harrisonii* might also be present in Africa. I am also indebted to Prof. H. Humbert and his staff for the facilities which enabled me to work in the Paris herbarium.

A NOTE ON THE ECOLOGY OF RHIZOPHORA IN NIGERIA.

H. J. Savory.

The mangrove swamps of Nigeria, and probably also of other parts of West Africa, show the same zoning as those of the comparable areas on the American coast. There is a *Rhizophora* zone which extends to the limit of the diurnal tides and is flooded twice daily, and an *Avicennia-Paspalum* zone, which lies between the high tide limit and the spring tides, and is flooded twice monthly. The three species of *Rhizophora* which occur appear to have different requirements and tend to form separate consociations in the *Rhizophora* zone. *R. racemosa* G. F. W. Meyer is the commonest species and is the pioneer at the edge of the alluvial salt swamp, to the exclusion of the other two. It reaches its greatest size, up to 40 m., on the marginal areas of the zone, but towards the older, inner areas it diminishes in size and vitality, down to an unhealthy shrub up to 4 m. high. Many of the mangrove areas are regularly felled for firewood and the *R. racemosa* trees may never reach their mature size. Except in remote areas, the trees form dense 'thicket' stands about 10 m. high, where individual trees are difficult to distinguish.

R. harrisonii Leechman has not previously been distinguished from *R. racemosa* in the *Rhizophora* zone of the West African swamps ; it is however dominant in the middle areas of the zone. It does not compete with *R. racemosa* as a pioneer, although it prefers the wetter, middle parts, to the firmer and more peaty soil towards the inner limit.

R. mangle Linn. is only found on the drier, inner limit of the *Rhizophora* zone in West Africa, although it is reported as the pioneer species in the American mangrove swamps. It grows as a healthy shrub up to 4 m. high. In America it forms extensive forests of large trees but, so far, there are no confirmed reports of large trees of *R. mangle* in the mangrove forests of West Africa.

It is likely that the explanation for this distribution of the three species of *Rhizophora* lies in differences in their salt tolerance. V. J. Chapman (in Journ. Linn. Soc. **52** : 407–447 (1943)) showed that on the Jamaican

shoreline *R. mangle* had a high optimum salt tolerance, while *R. racemosa* had a low optimum salt tolerance. In West Africa *R. racemosa* has often been reported growing well in fresh water conditions but *R. mangle* has only been found associated with salt-swamp. In the Everglades (Florida) mangrove areas, where *R. mangle* is the forest species, the mangrove swamps are more open to the sea and are not subject to inundation by river flood-water. In the delta areas of West Africa where for considerable periods during the wet season, the mangrove swamps are flooded with practically fresh water, *R. racemosa* is the forest species and *R. mangle* is confined to higher land. In the wet season this land will be less subject to flooding by fresh water and in the dry season it will be flooded only by the high tides, so that the salt concentration may be much higher as a result of evaporation, than it is in the *R. racemosa* area. This would also explain why no large trees of *R. mangle* have been reported, as it is confined to older, more peaty soil on which, even in America, it only grows to shrub form.

British Flowers in Colour*.—The present spate of popular botanical literature shows no sign of abating. Every month the booksellers' shelves exhibit yet another guide to potential nature-lovers, a portable volume lavishly illustrated with photographs and glowing colours, written by expert nature-lovers with such enthusiasm and persuasion that even the most confirmed town-dweller must feel the urge to leave his grimy retreat in search for Amphibious Polygonum and Marsh Milk Parsnip. Never was there a time when the botanical interests of the common man were so sedulously stimulated and so abundantly satisfied.

The present work falls into the first class of popular plant books—the text is written with winsome lucidity, and, a thing more rarely found, with accurate and extensive knowledge. The chapters deal with the majority of plant communities found in this country, and include some notes on gardens and garden plants for those Sybarites who do not obtain sufficient gratification from the more modest attractions of the native flora. The photographs are excellent, and the coloured plates, even if a little too stiff, are always adequate and occasionally very good. The professional would have been glad to see more prominence given to three plants : *Lactuca macrophylla*, *Petasites fragrans* and *Veronica filiformis*—a trio which seem to rise where'er the nature-lover treads and which are sent unfailingly to some National Institute for identification.

This is a good book, and handsome too, yet one cannot put it down without reflecting, a little sadly, on the altered state of the professional taxonomist ; not for him the photographs and glowing colours—if he is fortunate enough to find a publisher, his monograph or revision is more likely to appear (irregularly) in parts, probably without illustrations, and certainly without coloured illustrations—for the glory and the elephant folio have both departed.

R. D. MEIKLE.

*British Flowers in Colour, Advisory Editor B. L. Burtt. Odhams Press Ltd., Long Acre, London, pp. 192, price 21s. net.

AFRICAN ORCHIDS : XXI*.

V. S. Summerhayes

This contribution contains the descriptions of a number of new species and various taxonomic and nomenclatural notes, all dealing with orchids from the African region in its broad sense, including Madagascar. These include especially studies on parts of the genera *Polystachya* and *Eulophia* and new treatments of the genera *Stolzia* and *Graphorkis*.

Much of the work has been carried out in connection with the identification of collections from the Parc National Albert in the Belgian Congo, these having been kindly sent to me for study by Prof. W. Robyns, Director of the Brussels Botanic Gardens. They include a number of interesting plants, several of which are described in the following pages as new species.

The type specimens of all the new species are in the Kew Herbarium except where otherwise stated.

Cynorchis kassneriana *Kraenzl.* in Engl. Bot. Jahrb. **51,** 377 (1914), subsp. **tenuior** *Summerhayes*, subsp. nov. ; a typo planta graciliore, inflorescentiis sub-laxifloris, floribus paulo minoribus, labelli calcari cylindrico apice haud inflato differt.

Belgian Congo. Between Rutshuru and Goma, near Matiaso, 1700 m. alt., in sclerophyllous maquis on recent lava, Dec. 1944, *Germain* 3058 ; between Mihanga and Kibumba, on lava plain between Mts. Nyamlagira and Ninagongo, 2050 m. alt., on old lava, Oct. 1937, *Lebrun* 7901 ; between Mushumangabo Crater and Rulenga, in forested margins of rough lava, on moss-covered humus, Jan. 1931, *Burtt* 3120 (type) ; no exact locality, but probably from the same region as above, *Germain* 3599.

Uganda. Kigezi, Impenetrable Forest, on mossy bank in deep shade, Nov. 1948, *Eggeling* 5847.

The above new subspecies of *Cynorchis kassneriana* is very similar in general appearance to the type subspecies but differs in the characters given in the diagnosis. In particular the inflorescences are not so dense-flowered which gives them a more graceful appearance. The spur also is clearly different, being almost the same diameter along its whole length instead of possessing the constriction in the middle and somewhat inflated apex which is characteristic of the typical subspecies.

Subsp. *tenuior* is so far known only from the volcanic region north of Lake Kivu in the Belgian Congo and the western border of Uganda adjacent to this region. The typical subspecies, on the other hand, does not occur in the above region, but has a much wider distribution from Ruwenzori eastwards to Kenya Colony, and southwards to southern Tanganyika Territory and Mt. Zomba in Nyasaland.

Habenaria filicornis *Lindl.* Gen. and Sp. Orch. 318 (1835).

In my last contribution to this series (Kew Bull. **1951,** 462 : 1952) I stated that the name *Habenaria filicornis* (Thonn.) Lindl. could not be

*Continued from K.B. 1951, 475.

used for this species, because it was based on the later homonym *Orchis filicornis* Thonn., and would have to be replaced by *Habenaria spiranthes* Rchb. f. Mr. J. E. Dandy has, however, pointed out to me that under Art. 69 of the International Rules of Nomenclature the epithet *filicornis* can be applied to this species, provided that the name Thonning is not cited in brackets, and that it will date for priority only from 1835. It is thus possible to retain the old name for this species in the form cited above and it is unnecessary to adopt the later name *H. spiranthes*.

Habenaria (§**Commelynifoliae**) **bequaertii** *Summerhayes*, sp. nov. ; a *H. coeloglossoidi* Summerh. labelli partitio intermedia quam lateralibus paulo longiore, antherae canalibus nullis, a *H. peristyloidi* A. Rich. inflorescentiis usque ad 12-floris tantum, labelli calcari circiter 1 cm. longo, antherae connectivo plus 1 mm. lato satis distinguenda.

Herba terrestris, debilis, 25–45 cm. alta, radicibus exceptis glaberrima. *Tuber* ellipsoideum vel ovoideum, 1·5–2 cm. longum, circiter 1 cm. diametro, sparse pilosum ; radices e basi caulis exorientes, flexuosae, sparse vel subdense lanatae, circiter 1 mm. diametro. *Caulis* ± erectus vel adscendens, graciliusculus, teres, basi vaginis duabus arctis vestitus, medio laxiuscule 3–5-foliatus, superne folio parvo bracteiformi instructus. *Folia* adscendentia vel sub-erecta, lineari-lanceolata vel fere linearia, apice breviter acuminata, 4–16 cm. longa, 4–13 mm. lata, tenuiter herbacea. *Inflorescentia* terminalis, 4–10 cm. longa, laxiuscule usque ad 12-flora ; rhachis gracilis, leviter flexuosa ; bracteae lanceolatae, acuminatae, usque ad 2·2 cm. longae. *Flores* sub-erecti, virides vel viridi-albi ; pedicellus cum ovario 8–15 mm. longus. *Sepalum* intermedium erectum vel leviter incurvatum, ovatum, apice acutum vel subobtusum, circiter 4·5 mm. longum et 2·75 mm. latum, leviter concavum ; sepala lateralia patentia vel leviter reflexa, valde oblique curvatim lanceolata vel ovata, apice breviter acuminata, 5·5–5·75 mm. longa, 2·75–3 mm. lata ; omnia sepala trinervia. *Petala* erecta, oblique ovata, superne ± crenato-denticulata, apice acuminata, circiter 5 mm. longa, 2·5–3 mm. lata, superne crassiora et opaca, nervis multiramosis. *Labellum* descendens, infra medium tripartitum, in toto 8·5–9 mm. longum ; partitio intermedia sub-lanceolato-ligulata, e basi usque ad apicem sensim angustata, apice ipso obtusa, 6–6·5 mm. longa, basi 1–1·5 mm. lata, trinervis, superne incrassata ; partitiones laterales ab intermedio divergentes, lineares, apice obtusae, 5 mm. longae, circiter 0·7 mm. latae, uninerves ; pars basalis indivisus 2–2·5 mm. latus ; calcar dependens, cylindricum, apice ± inflatum, 9–11 mm. longum, circiter 1 mm. diametro. *Columna* brevis, lata ; antherae connectivum fere 2 mm. altum, circiter 1·5 mm. latum, loculi ± divergentes, 2·2 mm. longi, canales nulli ; staminodia transverse elliptica, prominentia ; rostelli lobus intermedius latissimus, obtusus, lobi laterales apice angustati quam antherae loculi 2 mm. longiores ; brachia stigmatifera deflexa, clavata, circiter 2·25 mm. longa.

Belgian Congo. Ruwenzori, Butagu, 2800 m. alt., among mosses, April 1914, *Bequaert* 3854 (type in Herb. Brussels) ; Nyamevamba River valley, 2600 m. alt., in *Ericetum* among *Sphagnum*, Nov. 1931, *Lebrun* 4514.

This species appears to be referable to sect. *Commelynifoliae*, in which it belongs to the subgroup characterised by a trilobed lip, and petals which

are thickened and opaque in the upper part, including *H. coeloglossoides* Summerh., *H. obovata* Summerh., *H. epipactidea* Rchb. f. and, less characteristically, *H. peristyloides* A. Rich.

H. bequaertii, however, shows many features in common with the small genus *Roeperocharis*, particularly the general habit, the shapes of the perianth segments, including the labellum, and the truncate anther loculi which are not decurrent into special canals containing the caudicles as in most *Habenaria* species. On the other hand the stigmatic arms in the present species are simply club-shaped without any upwardly produced portion, while the middle lobe of the rostellum is well developed, the species in these two respects differing markedly from typical members of *Roeperocharis*. Nevertheless some of the species included in that genus, for example, *R. platyanthera* (Rchb. f.) Rchb. f. and *R. alcicornis* Kraenzl., seem intermediate in these characters between the typical members of the genus *Roeperocharis* and the species of *Habenaria* mentioned above, especially *H. bequaertii*. It is evident that further collections of the various species of *Roeperocharis*, most of which are known only from Abyssinia, are necessary in order to obtain a clearer view of the relation between this genus and *Habenaria*.

Didymoplexis madagascariensis (*H. Perrier*) *Summerhayes*, comb. nov. *Gastrodia madagascariensis* H. Perrier in Humbert, Fl. Madag. Orch. **1,** 212 (1939).

From the description of the plant given by Perrier de la Bâthie it is clear that it cannot be a true *Gastrodia*, in spite of Schlechter's statement to the contrary (Fedde, Repert. Spec. Nov. Beih. **33,** 122 : 1924). Examination of all the species of *Gastrodia* represented in the Kew Herbarium (13 species) shows that in no case is there any appreciable elongation of the fruiting pedicels, but that, on the other hand, the plants when in fruit bear a decided resemblance to *Neottia nidus-avis* (L.) R. Br. In *Didymoplexis*, on the contrary, and to a less marked degree in *Auxopus*, the pedicels are normally much elongated in fruit, and this is also true for the present Madagascan species, in which they are said to be as much as 30 to 40 cm. in length. In the species recently described by me from East Africa (*D. africana*) the fruiting pedicels also reach a length of 25 cm.

Although the flowers of the present species have not been seen it seems almost certain that it is correctly referable to the genus *Didymoplexis*. I have not so far seen any species of *Auxopus* with fruiting pedicels exceeding 6 cm. in length.

Cheirostylis divina (*Guinea*) *Summerhayes*, comb. nov.

Mariarisqueta divina Guinea, Ensayo Geobot. Guinea Contin. Espan. 268, fig. 46 (1946).

On examination of duplicate specimens of the type of the above species I fail to see how they differ from the genus *Cheirostylis*. Most of the characters mentioned by Guinea are scarcely of generic significance, as can be seen by examination of the Asiatic species of *Cheirostylis*. The bilobed stelidia, referred to as the most important character, are evidently the two stelidia together with the two lobes of the rostellum, which are

placed in pairs, one pair in front of the other, and may be interpreted as being parts of the same structure. In all general floral characters the present species agrees with *Cheirostylis*, the slight toothing of the labellum lobes being clearly intermediate between the conditions in species like *C. lepida* Rolfe with entire lobes and those in many Asiatic species where the lobes are strongly toothed or even palmately lobulate.

Quite recently I have seen further excellent material of this species collected from three different localities in Sierra Leone by Mr. T. S. Jones. Careful examination shows also that the gathering from the Sugarloaf Mountain (*Scott-Elliot* 4027) cited in the Flora of West Tropical Africa (**2,** 421 : 1936) under *Cheirostylis lepida* (Rchb. f.) Rolfe is actually referable to *C. divina*.

Liparis purseglovei *Summerhayes*, sp. nov. ; affinis *L. neglectae* Schltr., a qua statura majore, floribus paulo minoribus, labello satis minore auriculis pro rata multo majoribus satis differt.

Herba terrestris, radicibus exceptis glaberrima, 20–30 cm. alta ; rhizoma breviter repens, 3–5 mm. diametro. *Caulis* erectus, basi ± incrassatus, teres, 5–10 cm. altus, basi 5 mm. diametro, basi radices flexuosas tomentosas emittens, superne cataphyllis paucis late lanceolatis ± vaginantibus vestitus, dimidio superiore 3–5-foliatus. *Folia* distincte vel longiuscule petiolata, suberecti vel ± patentia, in toto usque ad 16 cm. longa, basi breviter vaginantia ; petiolus ± canaliculatus, 1–3 cm. longus ; lamina late lanceolata vel elliptico-lanceolata, apice acuta vel apiculato-acuminata, 5–12 cm. longa, 2–6 cm. lata, plurinervia, textura (siccitate) chartacea. *Inflorescentia* terminalis, simpliciter racemosa, dimidio superiore sub-dense multiflora ; pedunculus 7–11 cm. longus, superne cataphyllis 3–4 lanceolatis acuminatis instructus, teres vel subangulatus ; rhachis 6–8 cm. longa, leviter angulata ; bracteae lanceolatae, acuminatae vel acutae, pedicellos cum ovariis saepius aequantes, 7 20 mm. longae. *Flores* suberecti, flavidi vel flavido-virides ; pedicellus cum ovario 10–13 mm. longus. *Sepalum* intermedium erectum, e basi latiore ± amplexicauli oblongo-lanceolatum, apice subacutum, 5·75 8 mm. longum, basi circiter 2·5 mm. latum, tri- vel subquinquenervium ; sepala lateralia deflexa, basi brevissime coalita, oblique curvatim oblonga vel oblongo-elliptica, apice obtusa, 4·75–7 mm. longa, 2·25–2·75 mm. lata, 5-nervia. *Petala* patentia vel deflexo-patentia, linearia, apica obtusa, basi leviter dilatata, 5–8·5 mm. longa, 0·3–0·75 mm. lata, uni- vel binervia. *Labellum* sessile, deflexim curvatum, e basi angustiore auriculata transverse ellipticum, auriculis basalibus rotundatis, apice rotundatum, in toto 3·5–5·5 mm. longum, dimidio distali 4·5–6 mm. latum, plurinervium, basi ante columnam callo humili antice truncato instructum. *Columna* porrecta, vix curvata, apice truncata, 3·25–3·5 mm. longa, basi ± dilatata ; androclinium leviter excavatum, fere horizontale ; fovea stigmatica late quadrata. *Capsulae* ellipsoideae, circiter 13 mm. longae.

Belgian Congo. Virunga Mts., Mt. Nyamlagira, 2060 m. alt., in mountain forest on very old lava, Feb. 1932, *Lebrun* 4875.

Uganda. Kigezi, Rubaya, 2100 m. alt., in forest, Dec. 1947, *Purseglove* 2577 (type) ; Kanaba Gap, 2400 m. alt., in woodland, March 1947, *Purseglove* 2354.

This species is clearly a close relative of *L. neglecta* Schltr. and *L. bowkeri* Harv., but may be recognised by the comparatively short labellum which has a much more pronounced narrowed basal portion than in *L. neglecta*. It is a plant of high altitudes in south-western Uganda and the neighbouring part of the Belgian Congo. The species is named after the collector, Mr. J. W. Purseglove, who has made important contributions to our knowledge of the orchids of Uganda.

Liparis salassia (*Pers.*) *Summerhayes*, comb. nov.

Epipactis salassia Pers. Syn. Pl. **2,** 513 (1807).

Serapias salassia (Pers.) Steud. Nomencl. Bot. ed. 1, 767 (1821).

Malaxis purpurascens Thouars, Orch. Iles Aust. Afr. tt. 26 & 27 (1822).

Liparis purpurascens (Thou.) Lindl. in Edw. Bot. Reg. **11,** sub. t. 882 (1825) ; A. Rich. Monogr. Orch. Iles France & Bourbon, 53 (1828) ; Schltr. in Beih. Bot. Centralbl. **33,** ii. 413 (1915).

Neottia salassia (Pers.) Steud. Nomencl. Bot. ed. 2. **2,** 189 (1841).

Leptorchis purpurascens (Thou.) Kuntze, Rev. Gen. Pl. 670 (1891).

In his original description Persoon states that his *Epipactis salassia* is the plant in Jussieu's herbarium to which Commerson had given the manuscript name of *Ophrys salassia*. Achille Richard, in his account of *Liparis purpurascens* (see above reference), also observes that *Ophrys salassia* Commerson is identical with the plants described by himself and Thouars. Although we know very little about either of these plants (indeed, Frappier states in Cordemoy's Flora of Réunion (186 : 1895) that he had not seen the species in any of the six French herbaria which he had examined) there seems no reason for doubting the above synonymy, which incidentally is accepted by Schlechter in the reference given above. The correct name for the plant concerned is therefore *Liparis salassia* (Pers.) Summerh.

Polystachya (§ **Caulescentes**) **ligulifolia** *Summerhayes*, sp. nov. ; ab *P. nigrescenti* Rendle foliis pro rata angustioribus siccitate non nigrescentibus, labello longiore quam lato medio ecalloso satis distinguenda.

Herba epiphytica usque ad fere 30 cm. alta, rhachidibus exceptis glabra. *Caules* e rhizomate repenti exorientes, circiter 1 cm. distantes, erecti, 5–12 cm. alti, inferne vaginis arctis fere omnino obtecti, superne 2-3-foliati, teretes, 1–3 mm. diametro, basi radices ramosas flexuosas griseas emittentes. *Folia* fere erecta ; vagina longitudinaliter costulata ; lamina anguste ligulata, utroque angustata, apice brevissime bilobulata obtusa, 10–15 cm. longa, 7–12 mm. lata, tenuiter coriacea, siccitate non nigrescentia. *Inflorescentia* terminalis, simpliciter racemosa vel ramis paucis abortivis instructa, usque ad 6 cm. longa, superne sub-dense circiter 7-flora ; pedunculus ut rhachis sparse pubescens, teres, 2–3 cm. longus, cataphyllis paucis sub-vaginantibus lanceolatis acutis instructus ; bracteae patentes vel ± recurvatae, e basi lata acuminatae, 1–3 mm. longae. *Flores* adscendentes, flavido-virides, glabri ; pedicellus cum ovario 8–10 mm. longus, sparsissime pubescens. *Sepalum intermedium* lanceolato-oblongum, subacutum, 8 8·5 mm. longum, circiter 4·25 mm. latum, trinervium ; sepala lateralia oblique triangularia, apice acuta,

margine postico (superiore) 12·5 mm. longa, basi 9 mm. lata, cum pede columnae adnata mentum conicum obtusum circiter 7 mm. longum formantia, subquinquenervia. *Petala* oblanceolato-spathulata, apice subacuta, 7 mm. longa, 2·5 mm. lata, subtrinervia. *Labellum* valde recurvatum, ex ungue brevi medio trilobatum, circiter 10 mm. longum, explanatum 8–9 mm. latum ; lobi laterales ± erecti, semiovati, rotundati, a lobo intermedio sinu acuto sejuncti ; lobus intermedius fere orbicularis, 4·75 mm. longus, 5 mm. latus, marginibus leviter sinuatis ; discus ecallosus. *Columna* crassa, brevis, apice truncata. *Capsulae* anguste ellipsoideae, circiter 3 cm. longi et 1 cm. diametro.

Belgian Congo. Ruwenzori, Butagu, 2300 m. alt., April 14th 1914, *Bequaert* 3660 (type in Herb. Brussels).

This species shows clearly the close relationship between the species of sect. *Caulescentes* allied to *P. imbricata* Rolfe and the group of species in sect. *Cultriformes* related to *P. galeata* (Sw.) Rchb. f. In some of the latter, for example *P. doggettii* Rendle which comes from the same mountain group, two leaves are borne rarely on a pesudobulb, in this respect being intermediate between the two sections. In general appearance, leaf characters and floral structure these two groups approach very closely, and it seems probable that the more specialised and montane species, now referred to sect. *Cultriformes* were derived originally from less specialised and lowland types similar to those included in sect. *Caulescentes*. On this general hypothesis we may look upon the present species as one which still retains more than one leaf on each stem but which in other respects possesses many of the characters of sect. *Cultriformes*.

Polystachya (§ **Calluniflorae**) **hastata** *Summerhayes*, sp. nov. ; affinis *P. calluniflorae* Kraenzl., a qua mento prominente, labello ex ungue cuneato oblongo lamina fere aequilongo subtriangulari-hastato satis differt.

Herba epiphytica, ± dependens, pedunculo et rhachide exceptis glabra. *Caules* (vel pseudobulbi) ± caespitosi vel e praecedentium usque ad medium exorientes, anguste cylindrici vel ± fusiformes, usque ad 10 cm. longi, 2–5 mm. diametro, primo cataphyllis vaginantibus subarctis acutis vel vaginis foliorum omnino vestiti, superne 2–4-foliati. *Folia* ± erecta, lineari-ligulata, apice acuta vel subacuta brevissime bilobulata, e vagina leviter ancipiti 3–18 cm. longa, 3–5 mm. lata, textura chartacea, nervo subtus prominulo. *Inflorescentia* terminalis, adscendens, simpliciter racemosa, 4–5·5 cm. longa, subdense multiflora ; pedunculus 2–3 cm. longus, gracilis, basi in spatha ancipiti paleacea 1·5–2 cm. longa inclusus, superne cataphyllis pluribus lanceolato-linearibus acutis instructus, ut rhachis breviter patentim pubescens ; rhachis teres, gracilis ; bracteae lineari-lanceolatae, acuminatae, usque ad 2·5 mm. longae. *Flores* erecto-patentes, glabri, roseo-albi ; pedicellus cum ovario 2·5–3 mm. longus. *Sepalum* intermedium ovatum vel elliptico-ovatum, apice apiculatum vel obtusissimum, 2–3 mm. longum, 1·5–2·25 mm. latum, concavum, trinervium ; sepala lateralia cum pede columnae adnata, mentum rotundatum circiter 1 mm. longum formantia, valde oblique ovata vel oblongo-ovata, margine antico basi valde dilatata, apice apiculato-acuminata, secus medium 2·25–3·25 mm.

longa, 1·75–2·25 mm. lata, tri- vel subquinquenervia. *Petala* obovata vel elliptico-obovata, apice obtusissima, 1·5–2·3 mm. longa, 1·25–1·75 mm. lata, ± trinervia. *Labellum* ambitu hastatum, in toto 2·6 3·6 mm. longum ; unguis oblongus, sursum sensim dilatatus, 1–1·5 mm. longus ; lamina triangularis vel ovato-triangularis, apice acuta vel subacuta, basi hastata marginibus basalibus cum ungue angulo fere recto formantibus, 1·5–2 mm. longa, basi 1·5–2 mm. lata, plurinervis, medio in sacco humili excavata. *Columna* brevis, crassa, 1–1·5 mm. longa, androclinio leviter excavato ; rostellum porrectum, apice obtusum, breviter bidentatum ; pes valde incurvatus, leviter canaliculatus ; ovarium levissime 6-sulcatum, glabrum.

Belgian Congo. Parc National Albert, between Kingi and Busogo, 1700–1800 m. alt., in sclerophyllous forest, Nov. 1937, *Lebrun* 8659; Kamatembe, in primeval forest, April 13th 1934, *De Witte* 1521.

Uganda. Kigezi, Ishasha Gorge, 1350 m. alt., in forest, Aug. 1949, *Purseglove* 3066 ; 3067 (type).

This species, together with its near ally *P. calluniflora* Kraenzl., is intermediate in vegetative characters between the sections *Calluniflorae* and *Superpositae* of Kraenzlin. In both species the pseudobulbs may be either caespitose in arrangement, each stem arising from near the base of the preceding one or, on the other hand, subsequent pseudobulbs may arise from anywhere as far as half-way up existing pseudobulbs. In the latter case, as in the type specimens of both the above species, an extended sympodium is produced which is very similar to that formed by species of sect. *Superpositae*. In floral characters the species resemble more closely other species of sect. *Calluniflorae* Kraenzl.

There is considerable evidence that sect. *Superpositae*, like sect. *Cultriformes*, is not really a natural section, but contains a number of species of florally diverse affinity which have all developed superposed pseudobulbs. The present species and *P. calluniflora* are therefore best looked upon as members of sect. *Callunflorae* which have developed this special type of habit to a limited extent.

P. hastata can be distinguished from its ally by the prominent mentum to the flowers, with which is associated the long claw and relatively short lamina of the labellum. In *P. calluniflora* the claw is extremely short and the lamina correspondingly elongated. In general appearance the two species are very similar. *P. hastata* is at present known only from the mountains of central Africa. but *P. calluniflora*, which until recently had been found only in the neighbourhood of the Cameroons Mountain, was discovered by Dr. W. J. Eggeling in 1936 in the Impenetrable Forest in the Kigezi district of Uganda. In floral structure this material agrees well with that from West Africa.

Polystachya adansoniae *Rchb. f.* in Flora, **48,** 185 (1865), var. **elongata** *Summerhayes*, var. nov. ; a typo speciei pseudobulbis elongatis angustis inferne efoliatis fere teretibus satis differt.

Belgian Congo. Parc National Albert, Kamatembe, in primary forest, April 1934, *De Witte* 1524 ; same locality, Mt. Kabvana, in forest, April 1934, *De Witte* 1610 ; Kivu, between Lulenga and Sake, Feb. 1932, *Lebrun* 5054 ; Kivu, Goma, lava plains, 1650 m. alt., in savanna,

March 1948, *Purseglove* 2610, 2611 ; Region of Mokolos, Lake Ndalaga, 1715 m. alt., on tree among *Pennisetum*, Jan. 1945, *Germain* 3404.

Uganda. Kigezi Distr., Nyebeya, Impenetrable Forest, Oct. 1940, *Eggeling* 4150 ; near L. Mutanda, in fringing forest at swamp edge, Sept. 1936, *Eggeling* 3268 (type) ; Ankole Distr., Kalinzu Forest, Aug. 1936, *Eggeling* 3194.

This variety appears to be widespread in the mountain districts of the Kivu region of the Belgian Congo and western Uganda. It may be distinguished by the elongation of the upper internodes of the pseudobulbs which are long and narrow and more or less cylindrical instead of narrowly conical as in the type variety. There seem to be few if any differences in floral structure, though the middle lobe of the labellum, compared with the side lobes, is relatively shorter in variety *elongata* than in the type.

Polystachya (§ **Superpositae**) **tridentata** *Summerhayes*, sp. nov. ; affinis *P. ruwenzoriensi* Rendle et *P. ugandae* Kraenzl., ab illa foliis duplo majoribus, mento sepalorum late conico, ab hac foliis duplo latioribus, floribus majoribus, ab utraque labelli callo perlato distincte tridentato satis distinguenda.

Herba epiphytica, multiramosa, ± dependens, inflorescentiis exceptis glabra. *Caules* caespitosi, graciles, usque ad 30 cm. longi, radices numerosas ramosas flexuosas griseas vel fulvidas emittentes. *Pseudobulbi* (vel caules annui) superpositi, e praecedentium dimidio apicali exorientes, anguste cylindrici vel angustissime fusiformes, teretes, usque ad 9 cm. longi et 2 mm. diametro, primum vaginis paucis arctis omnino vestiti, apice 2–4-phylli. *Folia* suberecta, e basi vaginante oblongo- vel lanceolato-ligulata, apice brevissime subacute bilobulata, inferne ± angustata, 3–10 cm. longa, 5–11 mm. lata, siccitate textura subchartacea, plurinervia. *Inflorescentiae* simpliciter racemosae, 4–7 cm. longae, sublaxe 3–9-florae ; pedunculus gracilis, ± flexuosus, 2·5–3·5 cm. longus, ut rhachis densiuscule patentim pubescens ; bracteae erecto-patentes, anguste lanceolatae, longe vel caudato-acuminatae, usque ad 1 cm. longae. *Flores* sub-erecti, partim sordide rubro-violacei partim virides ; pedicellus cum ovario 5–7 mm. longus, dense patentim pubescens. *Sepalum* intermedium ± incurvatum, late lanceolatum, apice acutum vel acuminatum, convexum, 5·5–6 mm. longum, 2·5–3·25 mm. latum, tri- vel subquinquenervium ; sepala lateralia oblique curvatim lanceolato-triangularia, apice acuminata recurvata, margine superiore (postico) 9 mm. longa, basi 5·25–6·25 mm. lata, cum pede columnae adnata mentum late conicum rotundatum 4·5–5·5 mm. longum formantia, subquinquenervia ; omnia sepala extra sparse pubescentia. *Petala* oblanceolata, acuta, 4·5–5 mm. longa, 1–1·5 mm. lata, basi columna breviter adnata, uni- vel subtrinervia. *Labellum* recurvatum, ex ungue sursum sensim dilatato circiter 3 mm. longo glabro ambitu late ovatum, supra medium distincte trilobatum, in toto circiter 7·5 mm. longum et 4·5 mm. latum ; lobus intermedius orbiculari-ovatus, apice acutus recurvatus, circiter 3 mm. longus et latus, plurinervius ; lobi laterales apice ± triangulares, acuti, margine antico 1·2 mm. longi, ab intermedio sinu acuto sejuncti ; discus glaber, callo perlato transverso tridentato dentibus lateralibus quam intermedio majoribus instructus. *Columna* crassa,

1·5 2 mm. longa, apice truncata, pede incurvato circiter 5 mm. longo ; androclinium leviter excavatum ; anthera hemisphaerica, antice breviter producta emarginatim truncata ; fovea stigmatica elliptico-orbicularis.

Belgian Congo. Parc National Albert, Ruwenzori, 2500 m. alt., 1914, *Bequaert* 4660 b (type in Herb. Brussels) ; Lanuri, 2000 m. alt., May 1914, *Bequaert* 4662.

This species agrees with *P. ruwenzoriensis* Rendle and *P. ugandae* Kraenzl. in the possession of hairy ovaries, but differs from these species by the characters given in the diagnosis. The most striking feature is the very broad 3-toothed labellum callus, situated just below the insertion of the middle lobe and extending on to the bases of the lateral lobes. In all the allied species this callus is comparatively small and centrally placed.

Polystachya (§ **Cultriformes) macropoda** *Summerhayes* sp. nov. ; a *P. gracilenta* Kraenzl. inflorescentiis foliis circiter dimidio brevioribus, mento (vel pede columnae) pro rata longiore, labello superne distincte trilobato satis differt.—[*P. gracilenta* (non Kraenzl. 1894) Kraenzl. in Wiss. Ergebn. Deutsch. Zentr.-Afr.-Exped. 1907–08. t. IX, fig. 1 J K (1910)].

Herba epiphytica, usque ad 30 cm. alta, omnino glabra ; rhizoma breve, repens, radices numerosas pauciramosas flexuosas griseas emittens. *Caules* (vel pseudobulbi) caespitosi, erecti, graciles, usque ad 13 cm. longi, 1–2 mm. diametro, siccitate plurisulcati, apice monophylli, basi vagina tubulosa apice obtusa usque ad 3 cm. longa vestiti. *Folia* lineari-ligulata, apice subacute vel obtuse breviterque bilobulata, basi breviter angustata, 9–16 cm. longa, 4–7 mm. lata, subtus prominenter 5-nervia. *Inflorescentia* simpliciter racemosa, folia circiter dimidio brevior, 4–7 cm. longa, superne laxe 2–4-flora ; pedunculus gracilis, teres, 3–5 cm. longus, basi in spatha ± paleacea inclusa, supra medium vagina lanceolata instructus ; rhachis pedunculo similis ; bracteae e basi lata subvaginante patentes, acutae vel acuminatae, 1·5–2·5 mm. longae. *Flores* erecti vel suberecti, flavi vel aurantiaci, rubro-maculati ; pedicellus cum ovario 12–13 mm. longus. *Sepalum* intermedium ± incurvatum, lanceolato-oblongum, apice acutum apiculatum, circiter 7·5 mm. longum, 2·25–2·75 mm. latum, sub-quinquenervium ; sepala lateralia valde oblique curvatim triangulari-lanceolata, apice subacuta apiculata, margine superiore (postico) circiter 10 mm. longa, basi 6 6·25 mm. lata, cum pede columnae adnata mentum elongatum cylindrico-extinctiforme circiter 5·5 mm. longum formantia, quinquenervia. *Petala* curvatim spathulato-oblanceolata, apice obtusa, 6·25–7 mm. longa, circiter 1·75 mm. lata, subtrinervia. *Labellum* valde recurvatum, ex ungue anguste cuneato marginibus incurvatis circiter 5·5 mm. longo late ovatum, quarta parte apicali trilobatum, in toto 10·5 11 mm. longum, supra medium 5–5·25 mm. latum ; lobi laterales rotundati, antice obtusi vel subtruncati ; lobus intermedius late ovatus vel elliptico-ovatus, apice ± recurvato-apiculatus, 2·5–2·75 mm. longus, 2·25–2·75 mm. latus ; discus ecallosus, circiter 5-nervius. *Columna* porrecta, crassiuscula, apice truncata, 2·75–3 mm. alta, pede leviter incurvato 5 mm. longo ; androclinium vix excavatum ; rostellum breviter productum, triangulare.

Belgian Congo. Parc National Albert, between Mushumangabo and Mt. Nyamlagira, 2300 m. alt., in rather shady sclerophyllous forest, Aug. 1937, *Louis* 5131 (type in Herb. Brussels) ; Mt. Nyamlagira, 2200 m. alt., in upper storey of undergrowth of mountain forest, June 1945, *Germain* 3894.

This species is clearly related to *P. gracilenta* Kraenzl. and was confused with that species by Kraenzlin in his account of the orchids of Mildbraed's Central African collections. The species is characterised by the short inflorescences, rather long slender mentum to the flower and the distinctly trilobed labellum. These floral characters are well shown in the supposed illustration of *P. gracilenta* cited above. That species, however, has an extremely long branched inflorescence towering above the leaves and a very acute undivided labellum. I have already pointed out (Bot. Mus. Leafl. Harv. Univ. **12,** 289 ; 1942) that *P. purpureo-alba* Kraenzl. is conspecific with *P. gracilenta* and the figures published under the former of these two names by Kraenzlin (l.c. t. IX, fig. 1 E–F) are good representations of the flowers of the species.

The specific epithet of the present species is given in allusion to the long foot of the column.

Polystachya (§ **Cultriformes**) **megalogenys** *Summerhayes*, sp. nov. ; affinis *P. mildbraedii* Kraenzl., a qua tepalis brevioribus, mento pro rata majore, labelli lobo intermedio pro rata breviore, fructibus tertia parte breviore differt.

Herba epiphytica usque ad 20 cm. alta, omnino glabra ; rhizoma repens, breve, ± fractiflexum, gracile, radices numerosas flexuosas, griseas, 1–1·5 mm. diametro emittens. *Pseudobulbi* (vel caules) erecti, angustissime cylindrici, usque ad 7·5 cm. longi, 1–2 mm. diametro, siccitate leviter plurisulcati, apice monophylli, basi vagina elongata arcte vestiti. *Folia* ± erecta, ligulata vel elliptico-ligulata, apice obtusa vel ± inaequaliter subacute bilobulata, 4–14 cm. longa, 4–8·5 mm. lata, plurinervia. *Inflorescentia* terminalis, simpliciter racemosa, 1–3 cm. longa, sublaxe 2–4-flora ; pedunculus usque ad 2 cm. longus, spatha vaginante acuminata fere omnino obtectus ; bracteae e basi late ovato-orbiculari acuminatae, 1–4 mm. longae. *Flores* 2–5 mm. distantes, suberecti, pallide virides vel sordide flavi, rubro-notati vel tincti ; pedicellus cum ovario 5–7 mm. longus. *Sepalum* intermedium oblongo-lanceolatum, apice acutum, 6·5–7·5 mm. longum, 2·75–3·25 mm. latum, concavum, trinervium ; sepala lateralia oblique et leviter curvatim ovato-triangularia, apice acuta, margine superiore (postico) 7·5–9 mm. longa, basi 6–7 mm. lata, cum pede columnae adnata mentum rotundatum leviter incurvatum 5–6 mm. longum formantia, tri- vel subquadrinervia. *Petala* oblongo-oblanceolata, apice obtusa vel sub-acuta, 5·75–6·75 mm. longa, 1·6–2·25 mm. lata, basi columnae breviter adnata, subtrinervia. *Labellum* valde recurvatum, sectio leviter V-forme, dimidio apicali obscure trilobatum, 6–7 mm. longum, inferne 4·5–5·25 mm. latum, ecallosum ; lobi laterales semi-orbiculares, ab intermedio indistincte sejuncti ; lobus intermedius orbicularis vel transverse ellipticus, 2–2·5 mm. longus, 2·8–3 mm. latus. *Columna* brevis, crassa, 2·25 mm. longa, apice truncata, pede incurvato circiter 5 mm. longo ; anthera hemisphaerica, antice

angustata. *Capsulae* anguste ellipsoideae, 10–15 mm. longae, 4–5 mm. diametro, humiliter 6-carinatae.

Belgian Congo. Parc National Albert, Ruwenzori, Lamia, ± 2500 m. alt., in bamboo zone, May 1914, *Bequaert* 4358 (type in Herb. Brussels), 4359 ; Butagu, ± 2500 m. alt., April 1914, *Bequaert* 3726.

This rather undistinguished species is clearly closely related to *P. mildbraedii* Kraenzl. which was originally described from Mt. Ninagongo in the Virunga Range, and has since been found on the Uganda side of the Ruwenzori massif. This latter species has rather larger flowers in which the labellum is trilobed at about the middle instead of one third below the apex as in *P. megalogenys*. The capsules in *P. mildbraedii* also are distinctly longer, being from 2 to 2·5 cm. in length. The mentum in the present species is relatively large and rounded, the specific epithet being derived from this feature.

Polystachya (§ **Cultriformes**) **pachychila** *Summerhayes*, sp. nov. ; a *P. cultriformi* (Thou.) Spreng. foliis oblongo-ellipticis apice rotundatis, labello magis carnoso distincte trilobato lobis lateralibus valde carnosis lobo intermedio ligulato apice truncato apiculato sectio V-formi facile distinguenda.

Herba epiphytica, usque ad 35 cm. alta, inflorescentiis exceptis glabra. *Pseudobulbi* caespitosi, erecti, anguste cylindracei, verosimiliter teres sed siccitate valde rugulosi, usque ad 15 cm. longi, 1·6 mm. diametro, apice monophylli, basi radices numerosas valde ramosas tenues griseas emittentes, dimidio inferiore vaginis paucis imbricantibus infimis truncatis superioribus subacutis vestiti. *Folia* sessilia, elliptico-oblonga vel oblongo-elliptica, apice rotundata vel brevissime emarginata, basi ± rotundata vel fere subcordata, 3–14 cm. longa, 1–3·2 cm. lata, tenuiter coriacea, nervo subtus prominulo. *Inflorescentia* terminalis, erecta, paniculata, 6–21 cm. longa, sublaxe multiflora ; pedunculus 3·5–8 cm. longus, teres, ut rhachides sparse puberulus, basi spatha rigide paleacea ancipiti dorso carinata acuta 1–3 cm. longa inclusus, ceterum nudus ; rami 2–6, interdum ramosi, patentes vel erecto-patentes, usque ad 6 cm. longi ; rhachides interdum leviter fractiflexae, teretes ; bracteae breviter ochreatae, superne patentes vel ± recurvatae, e basi lata subito acuminatae, 1–3 mm. longae. *Flores* erecto-patentes, flavidi vel viridi-flavidi, purpureo- vel rubro-maculati ; pedicellus cum ovario 2–5 mm. longus, interdum sparse puberulus. *Sepalum* intermedium leviter incurvatum, lanceolato-oblongum, apice obtusum, apiculatum, 4·5–5·5 mm. longum, 2·25–2·5 mm. latum, concavum, trinervium ; sepala lateralia oblique triangulari-lanceolata, leviter curvata, parte distali deorsum vel sursum spectantia, apice apiculata, margine superiore 5·5–7·25 mm. longa, basi 3·5–4·5 mm. lata, cum pede columnae adnata mentum curvatum rotundatum 3–4 mm. longum formantia, tri- vel subquinquenervia. *Petala* subspathulatim oblanceolata, apice obtusa vel breviter apiculata, 4·25–5 mm. longa, 1·25–1·5 mm. lata, uninervia. *Labellum* sessile, carnosum, medio distincte trilobatum, in toto 4·5–5·75 mm. longum, 2·75–3·25 mm. latum ; lobi laterales erecti, valde carnosi, inferne rotundati, apice libero 1 mm. longo triangulari acuto, ab intermedio angulo fere recto sejuncti ; lobus intermedius ligulatus, interdum e basi sensim angustatus, apice truncatus ± emarginatus apiculo dorsaliter

interjecto, 2–2·8 mm. longus, 1–1·25 mm. latus, sectio leviter V-formis, trinervius ; discus callo humili transverso paulo infra apices loborum lateralium instructus. *Columna* brevis, crassa, subteres, 2–2·5 mm. longa, apice ± truncata, pede valde incurvato columnae longiore ; androclinium leviter excavatum ; rostellum vix productum, obtusum ; fovea stigmatica elliptica.

Belgian Congo. Parc National Albert, near Lake Kivu, 2100 m. alt., March 1935, flowered in cultivation, Aug. 1935, *Tweedie* 302 (type) ; Kamatembe, Bishakishaki River, April 1934, *De Witte* 1518 ; 1519 ; Kamatembe, same date, *De Witte* 1527 ; Kibumba, 2000 m. alt., in montane forest, June 1945, *Germain* 3945.

This rather striking species is evidently an ally of the widespread *P. cultriformis* (Thou.) Spreng. It may be recognised readily by the narrowly elliptical leaves which do not widen upwards as in *P. cultriformis* and which are rounded instead of acute at the apex. The labellum is very different from that of *P. cultriformis*, being much more distinctly three-lobed and quite fleshy. The very fleshy side-lobes end in an acute free end at about a right angle to the middle lobe, which is long and relatively narrow with a more or less truncate apex.

The species appears to be restricted to the Albert National Park, where it occurs at altitudes of about 2,000 metres.

Stolzia Schltr.

The genus *Stolzia* was described by Schlechter in 1915 (Engl. Bot. Jahrb. **53,** 564) from material collected by the German missionary Adolf Stolz in the Bundali Mountains west of New Langenburg at the head of Lake Nyasa in Tanganyika Territory. It was characterised by the inflorescence arising from the apex of the pseudobulbs as in *Polystachya*, the flowers resupinate as in *Bulbophyllum*, the fusion of the sepals at the base, and the possession, according to Schlechter, of 6 pollinia, instead of 4 as in the other two genera. Schlechter pointed out, however, that the genus was clearly related to *Polystachya* and placed it in the sub-tribe *Polystachyinae*.

Later Mansfeld, in dealing with the large collections made by H. J. Schlieben in Tanganyika Territory, described three more species, all from the Uluguru Mountains (Notizbl. Bot. Gart. Berlin, **11,** 1061–3 : 1934). These agreed with the original *S. nyassana* Schltr. in general features but all possessed 8 pollinia, 4 large and 4 small. Mansfeld states that he had been unable to find any pollinia in the type material of *S. nyassana*. I have examined the rich material at Kew of the type gathering (*Stolz* 2553) and have seen at least 7 pollinia in some of the flowers. As the pollinia easily fall out of the anther, there being no distinct viscidium to keep them together, it is often difficult to find all 8 pollinia in flowers of this genus.

Recently I have been able to examine the *Stolzia* material collected in the Uluguru Mountains by Mr. and Mrs. R. E. Moreau. This includes certainly *S. atroruba* Mansf. and also a gathering which I cannot distinguish from the original *S. nyassana* Schltr. The collection also contains what appear to be two species which do not agree with any of Mansfeld's

species, but the material is not sufficient to justify description at this stage.

All these species agree in having the pseudobulbs more or less short and fat so that the plants have a caespitose habit. Further investigations however have revealed the existence of a second group of species in the genus *Stolzia*, the members of which agree with the other group in technical vegetative and floral characters, with one exception, but have a very widely creeping growth, owing to the fact that the pseudobulbs are long and narrow and each one arises from just below the apex of the preceding one. Three of the species in this group have previously been described, two in *Bulbophyllum* and the other in *Polystachya* ; the fourth species is so far undescribed and is described later in this account.

Whereas the other group of the genus is found only in west-central and southern Tanganyika, the newly recognised group seems to be centred around the mountain area of Ruwenzori and the Virunga Mountains, though one species, *S. repens* (Rolfe) Summerh., has a much more extensive range. In view of the insignificant nature of the members of this group they have been mostly overlooked until recent years and it may be that further search will reveal yet more species of this affinity. The various species belonging to this group are now dealt with seriatim.

Stolzia repens (*Rolfe*) *Summerhayes*, comb. nov.

Polystachya repens Rolfe in Kew Bull. **1912,** 132.

For a long time I had been doubtful of the exact affinity of this species, which combines in its appearance the characters of the genera *Polystachya* and *Bulbophyllum*. During the last few years specimens in spirit and also fresh living plants have been received from various sources in East Africa. On careful examination of this material it is clear that the species is not referable to either of the above genera, but to *Stolzia* Schltr.

The present species is considerably smaller than any of the previously known species of the genus, and has a more creeping habit, but agrees in all essential features. These include the inflorescence arising from the apex of the pseudobulb, the *Bulbophyllum*-like resupinate flowers, the partial union of the sepals at the base, the small undifferentiated labellum, the more or less sub-spherical anther divided beneath into two distinct parts, each containing 4 pollinia (4 large and 4 small), and the broad truncate sub-emarginate rostellum.

I have now seen material which seems to be referable to this species from the Virunga Mountains in the Belgian Congo, Uganda, Kenya Colony, and the Mwinilunga district of Northern Rhodesia. There is also in the Kew Herbarium a sterile gathering of what may be the same species from near Bamenda in the British Cameroons.

Judging from living and other material received from two sources in Kenya Colony it appears that there may be in that country two distinct but closely allied species of this affinity, one with thicker and smaller leaves forming dense carpets and another with longer, thinner leaves and a more open type of growth. The first variant is clearly referable to *S. repens* but so far I have not seen flowers from the second variant. In dried specimens it is very difficult to distinguish between these two species, if such they be. Perhaps they are merely marked habitat or altitudinal forms.

Stolzia cupuligera (*Kraenzl.*) *Summerhayes*, comb. nov.

Bulbophyllum cupuligerum Kraenzl. in Engl. Bot. Jahrb. **43,** 342 (1909).

This species is even more of a puzzle than *S. repens* (Rolfe) Summerh. It was described originally from material collected by Mildbraed in the Rugege Forest on the mountains to the east of Lake Kivu in the Belgian Congo. The pseudobulbs are said to be monophyllous, while the sepals are stated to be united to one another at the base for a third of their length. Unfortunately nothing is mentioned about the characters of the column, anther, pollinia or rostellum, but as no special statement is made perhaps Kraenzlin saw only 4 pollinia, which would be in agreement with the characters of *Bulbophyllum* to which he referred the species.

Later, in the account of the botany of the Duke of Mecklenburg's expedition (Wiss. Ergebn. Deutsch. Zentr.-Afr.-Exped. 1907–1908, **2,** 85, t. IX, fig. 2 D & E : 1910) the species is figured, showing a plant resembling strongly *S. repens* (Rolfe) Summerh., discussed above, and having 2-leaved pseudobulbs. From all this and also the fact that Schlechter identified with the species a gathering made by Fries on Mt. Kenya, which material is clearly very closely related to, if not identical with *Stolzia repens*, it seems almost certain that Kraenzlin's *Bulbophyllum cupuligerum* is also a *Stolzia*, and I therefore make the above combination. Unfortunately the original specimen was destroyed with the Berlin Herbarium.

There are in the Kew Herbarium two gatherings from Mt. Mlinga in the Usambara Mountains which seem to agree in almost all respects with *Bulbophyllum cupuligerum* Kraenzl. These are very similar in habit to *S. repens* (Rolfe) Summerh., but the flowers have the sepals united for a greater distance than in that species, particularly the lateral sepals, which are united for some distance above the insertion of the labellum. In *S. repens* these sepals are free from one another to the base, though united to the dorsal sepal. In the two flowers which I have examined I could find only 4 and 2 pollinia respectively (the pollinia, not being attached to any viscidium, are easily dislodged from the anther), so it appears that in this plant there are only 4 pollinia, 2 large and 2 small. This is in agreement with my suggestion as to Kraenzlin's observations on the type specimen of *B. cupuligerum*. In all other respects the Usambara material agrees with the genus *Stolzia*.

Stolzia peperomioides (*Kraenzl.*) *Summerhayes*, comb. nov.

Bulbophyllum peperomioides Kraenzl. in Engl. Bot. Jahrb. **43,** 341 (1909) et in Mildbraed, Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. 1907–1908, **2,** 85, t. IX, fig. 2 A-C (1910).

Although it is not possible to examine the type specimen of this species, as it was destroyed during the war, there seems little doubt from the description and illustration that the species is referable to *Stolzia* and not to *Bulbophyllum*. Reference to the illustration of *B. gracilipes* King and Pantling, with which Kraenzlin compares it, shows a plant of quite different basic construction both vegetatively and florally. The view that *B. peperomioides* is really a *Stolzia* receives almost overwhelming support from the discovery of another very closely allied species, *Stolzia diffusa* Summerh., described below. This is strikingly similar to *B.*

peperomioides Kraenzl. in all described and illustrated characters, while in the structure of the column, anther and pollinia it is a characteristic member of the genus *Stolzia*. Kraenzlin in his description mentions that the sepals are united at the base, one of the characters of *Stolzia*, while he also refers to the simple ecallose labellum and the very small column. He appears to misinterpret the line of demarcation between the pseudobulbs and leaves, as he describes the rhizome as creeping with cylindrical one-leaved pseudobulbs 5–7 mm. long, placed at intervals of 2–4 cm. He compares these pseudobulbs with a petiole. In *S. diffusa* Summerh., however, the " rhizome " consists of the superposed pseudobulbs, each new one arising from just below the apex of the previous one. The single leaf is borne at the apex of the pseudobulb and has a narrow cylindrical basal part corresponding to the sheath in most orchid leaves, above which is an articulation and then the petiole and lamina. The illustration of *B. peperomioides* shows exactly the same type of general construction and I have little doubt that the two species agree in these features.

S. peperomioides, instead of possessing the single-flowered inflorescences found in *S. repens*, *S. cupuligera* and *S. diffusa*, has a long peduncle bearing several flowers in the upper part. In this respect it agrees with *S. nyassana* Schltr. and *S. atrorubra* Mansf. which belong to the other group of the genus. On the other hand at least one of the plants collected by Mr. and Mrs. Moreau is said by them to have constantly one-flowered inflorescences. Evidently the number of flowers in the inflorescence varies from one to several in both groups within the genus.

Stolzia diffusa *Summerhayes*, sp. nov. ; affinis *S. repenti* (Rolfe) Summerh. et *S. peperomioidi* (Kraenzl.) Summerh., ab hac foliis verosimiliter angustioribus, inflorescentiis brevissimis unifloris, floribus majoribus, petalis ligulatis 5-nerviis, mento prominente, ab illa pseudobulbis monophyllis, foliis longioribus distincte petiolatis cum vagina articulatis facile distinguitur.

Herba epiphytica, humilis, late repens ; caulis horizontalis, usque ad 35 cm. longus vel ultra, e pseudobulbis vel articulis compositus. *Pseudobulbi* (vel articuli) angustissime cylindrici vel teretes, 1–4 cm. longi, circiter 1 mm. diametro, vaginis paucis scariosis obtusis distanter instructi, apice leviter dilatati, cataphyllis paucis scariosis vestiti, monophylli, per totam longitudinem radices graciles flexuosas puberulas emittentes. *Folia* ± erecta, in toto 2–5·5 cm. longa ; basis (vagina) fere teres, faciei superiore canaliculata, 3–7 mm. longa, circiter 0·5 mm. diametro, apice cum petiolo articulata ; lamina basi in petiolum brevem sensim angustata, oblanceolata vel elliptico-oblanceolata, apice rotundata vel breviter bilobulata, petiolo incluso 1·5–4·5 cm. longa, 5–10 mm. lata, obscure plurinervia. *Inflorescentia* e basi folii exoriens, brevissima, semper uniflora ; pedunculus 2–4 mm. longus, saepe in florem abortivum terminans ; bractea vaginiformis, apiculata, brevissima, pedicello cum ovario bene brevior. *Flos* resupinatus, ± incurvatus, brunneo-violaceus ; pedicellus cum ovario circiter 3 mm. longus. *Sepalum* intermedium leviter recurvatum, lanceolato-ligulatum, apice obtusum, basi cum sepalis lateralibus per 0·75 mm. connatum, 8 mm. longum, 3 mm. latum, quinquenervium ; sepala lateralia valde decurvatim et falcatim ovata, apice breviter acuminata, 7 mm. longa, fere 5 mm. lata, sub-

quinquenervia, cum pede columnae adnata mentum leviter incurvatum obtusum circiter 4·5 mm. longum formantia. *Petala* leviter curvata, ligulata, apice acuta, circiter 7 mm. longa, 2 mm. lata, quinquenervia, basi margine antico breviter decurrentia. *Labellum* valde curvatum, simplex, oblanceolatum, acutum, sectio late U-forme vel V-forme, circiter 4·5 mm. longum, 2·5 mm. latum, disco linea mediana incrassata instructo, ceterum ecallosum. *Columna* brevissima, 1 mm. longa ; anthera sub-hemisphaerica, papillata, distincte 2-lobata ; pollinia 8, 4 majora et 4 minora, in paria ± visco connexa, viscidio proprio nullo ; rostellum deflexum, perlatum, lunatim truncatum.

Belgian Congo. Ruwenzori, Lanuri, 1800 m. alt., May 1914, *Bequaert* 4492 (type in Herb. Brussels).

A graceful widely creeping species clearly very similar vegetatively to *S. peperomioides* (Kraenzl.) Summerh., but with inflorescences and flowers agreeing in all essential features with *S. repens* (Rolfe) Summerh. It appears that a careful investigation of the epiphytic orchid flora of this general region may yet reveal other species of this easily overlooked genus.

Bulbophyllum bequaertii *De Wildem.* in Rev. Zool. Afr. **9,** Suppl. Bot. 18 (1921).

Apart from the original gathering made by Bequaert at Masisi in the Belgian Congo, I have now seen four collections from western Uganda, in the districts of Kigezi, Ankole and Toro. The species is evidently widely spread in this region. It should be noted that according to De Wildeman the labellum is glabrous ; actually the margins are ciliate in the basal part and ciliolate nearly to the middle.

var. **brachyanthum** *Summerhayes* var. nov. ; a typo foliis paulo angustioribus, sepalis brevioribus pro rata latioribus, labello breviore ± curvato dimidio distali vix dilatato basi magis ciliato differt.

Uganda. Kigezi, Impenetrable Forest, 1500 m. alt., in forest, April 1948, *Purseglove* 2680.

Kenya Colony. Nyanza Prov., Kaimosi, 1920 m. alt., in forest, Sept. 1934, *Tweedie* 233 ; Kaimosi-Kakamega, Nov. 1937, coll. M. Fitzpatrick, cult. *Cunningham-van Someren* 16 ; Kericho, Kiptiget River, 1940, *Copley* 54 ; Kericho, cult. and flowered Nairobi, April 1951, *Piers* 36 ; Sotik, Chepalungu Forest, 1950 m. alt., Feb. 1931, *Gardner* 2448 (type).

This variety is very closely similar to the type in vegetative features and the general appearance of the inflorescence. The leaves on the whole, however, are rather narrower than in the type variety. In floral characters there are a number of differences which are mentioned in the diagnosis, the most striking being the shorter sepals and labellum. In addition the cilia on the margins of the labellum are distinctly longer than in the type variety though much shorter than in *B. cochleatum* Lindl.

Bulbophyllum burttii *Summerhayes*, sp. nov. ; ex affinitate *B. bequaertii* De Wildem. et *B. cochleati* Lindl., ab illo pseudobulbis brevioribus inferne magis dilatatis, inflorescentiis brevioribus minus robustis, floribus flavidis vel viridibus, sepalis dimidio longioribus, labello ligulato haud

lingulato-dilatato, ab hoc labello ligulato basi tantum breviter ciliato satis distinguitur.

Herba epiphytica, 10–20 cm. alta, fere omnino glabra. *Rhizoma* repens, usque ad 20 cm. longum vel ultra, ± teres, 3–4 mm. diametro, juventute vaginis sublaxis obtusis fere omnino vestitum, sub pseudobulbis radices numerosas ramosas flexuosas tenues minus 1 mm. diametro saepius glabras emittens. *Pseudobulbi* 2–6 cm. distantes, erecti, anguste cylindrico-conici vel fusiformi-conici, 4-angulati, 2·5–5·5 cm. longi, inferne 5–10 mm. diametro, juventute vaginis 4–5 imbricatis obtusis superioribus longioribus omnino vestiti, apice diphylli. *Folia* ± divergentia, suberecta, ligulata vel oblongo-ligulata, basi breviter petiolata, apice brevissime obtuse bilobulata, 5–16 cm. longa, 5–15 mm. lata, supra leviter canaliculata, subtus nervo mediano prominente, siccitate tenuiter sub-carnosa. *Inflorescentia* erecta, simpliciter racemosa, 10–16 cm. longa, dense multiflora, floribus secundis ; pedunculus 3–5 cm. longus, 1–2 mm. diametro, verosimiliter teres, vaginis paucis arctis acutis instructus ; rhachis leviter fractiflexa, obtuse angulata ; bracteae late lanceolatae, acutae, 5–6·5 mm. longae, pedicellos cum ovarios valde superantes, paleaceae. *Flores* ± distichi, 2–3·5 mm. distantes, porrecti, flavidi vel virides ; pedicellus cum ovario 2–3 mm. longus. *Sepalum* intermedium erectum, late lanceolatum, acutum, concavum, 7·5–8·5 mm. longum, circiter 2·75 mm. latum, trinervium ; sepala lateralia deflexim reflexa, oblique triangulari-lanceolata, obtusa, basi cum pede columnae adnata, 7–7·25 mm. longa, basi circiter 1·75 mm. lata, subtrinervia. *Petala* e basi lata subito angustata, curvatim ligulata, apice rotundata, 1·5–1·75 mm. longa, superne 0·25 mm. lata, uninervia. *Labellum* mobile, deflexim curvatum, e basi valde carnosa oblongo-ligulatum, obtusum, 1·75 mm. longum, 0·6 mm. latum, marginibus basi ciliatis superne papillatis, binerve. *Columna* erecta, brevis, crassa, stelidiis angustis incurvatis acutis circiter 1 mm. longis, androclinio excavato, filamento triangulari leviter incurvato, anthera hemisphaerica, fovea stigmatica transverse elliptica.

Belgian Congo. Parc National Albert, between Rulenga and Burunga, in forest below Mt. Mikeno, 12–60 ft. above ground in tall trees, Jan. 1931, *Burtt* 3164 (type) ; Kibumba, between Rutshuru and Goma, 2000 m. alt., in mountain forest, Dec. 1944, *Germain* 2996.

This species resembles *B. cochleatum* Lindl. in general features but differs in the uniformly yellow and green flowers and the labellum being shortly ciliate at the base only instead of with a marginal growth of long hairs. There are other minor differences in the floral parts. So far *B. burttii* is known only from a limited region between Mts. Mikeno and Niragongo in the Albert National Park. The species is named after its discoverer, the late Mr. B. D. Burtt.

Bulbophyllum scariosum *Summerhayes*, sp. nov. ; affinis *B. bifario* Hook. f., a quo inflorescentiis foliis brevioribus gracilioribus ± nutantibus paucifloris, bracteis dimidio brevioribus, sepalo intermedio satis breviore minus convexo, sepalis lateralibus brevioribus sed basi satis latioribus, petalis duplo longioribus trinerviis, columnae stelidiis vix productis, pede 3·5 mm. longo facile distinguendum.

Herba epiphytica vel saxicola usque ad 10 cm. alta, omnino glabra ; rhizoma repens, 1–2 mm. diametro, juventute vaginis scariosis dense

imbricantibus omnino indutum, e pseudobulborum basibus radices tenues flexuosas ramosas emittens. *Pseudobulbi* 1·5–3 cm. distantes, erecti, anguste conico-ovoidei vel conico-cylindracei, siccitate irregulariter 3 4-angulati, 1·5–3·5 cm. longi, inferne 8–11 mm. diametro, basi primo cataphyllis scariosis vestiti, apice diphylli. *Folia* fere sessilia, elliptica, oblonga vel ligulata, basi angustata, apice inaequaliter rotundato-bilobulata, 3–8 cm. longa, 6–11 mm. lata, supra leviter canaliculata, subtus carinata, tenuiter coriacea. *Inflorescentia* e basi pseudobulbi exorta, foliis saepius brevior, gracilis, superne ± nutans, pauciflora, 6 8·5 cm. longa ; pedunculus 4–5 cm. longus, teres, vaginis lanceolatis acutis scariosis fere omnino vestitus ; rhachis leviter angulata ; bracteae ± patentes, cymbiformes, acutae, scariosae, circiter 5 mm. longae. *Flores* fere sessiles, de colore nil constat. *Sepalum* intermedium erectum, e columnae dimidio superiore exortum, late triangulari-ovatum, apice apiculatum, 4·5 mm. longum, 3·75 mm. latum, convexum, trinervium ; sepala lateralia ± patentia, valde oblique ovato-triangularia, apice acuminata, 7·25 mm. longa, prope basin 5 mm. lata, binervia, basi cum pede columnae adnata mentum 3·5 mm. longum formantia ; omnia sepala opace scariosa. *Petala* e columnae lateribus exorta, oblique elliptica, apice rotundata, 4·25 mm. longa, fere 3·5 mm. lata, trinervia, tenuiter scariosa. *Labellum* valde recurvatum, ligulatum, carnosum, apice rotundatum, basi breviter cordatum, circiter 6 mm. longum, 1·5 mm. latum, sectio V-forme. *Columna* erecta, antice excavata, basi cum sepalo intermedio et petalis adnata, 2·75 mm. alta, stelidiis brevissimis vix evolutis, pede horizontali canaliculato ; antherae filamentum triangulare, incurvatum ; ovarium sursum dilatatum, circiter 1 mm. longum.

Sierra Leone. Loma Mts., N.E. face of Bintumane Peak, 1620 m. alt., in re-entrant forest, Jan. 1951, *Jones* 64 (type) ; Loma Mts., in high altitude grasslands, on granite blocks, Nov. 1944, *Jaeger* 568 (sterile).

French Guinea. Nimba Mts., 1600 m. alt., in montane forest, April 1942, *Schnell* 1094 (sterile).

This rather distinct little species is clearly allied to *B. bifarium* Hook. f. which, however, is known only from the British and French Cameroons. From this species it differs by the characters mentioned in the diagnosis. The most obvious difference is in the inflorescence, which in *B. bifarium* is rather robust, stiff and erect with numerous very stiff spreading bracts over 1 cm. in length. In the present species the inflorescence is shorter and more slender, the upper portion tends to be nodding, while the few bracts are less than half the size of those in its ally. The floral characters of the two species clearly show that the above differences are not due to poor growth, habitat conditions or the like. So far *B. scariosum* is known only at considerable altitudes in the high mountains of the interior of Sierra Leone and French Guinea. The specific epithet is given in allusion to the chaff-like cataphylls, bracts and perianth members, excluding the labellum.

Eulophia aequalis (*Lindl.*) *Bolus* in Journ. Linn. Soc. Lond. Bot. **25,** 184 (1889).

Lissochilus aequalis Lindl. in Hook. Comp. Bot. Mag. **2,** 204 (1837).

Eulophia rupestris Rchb. f. in Linnaea, **20,** 682 (1847), non Lindl.

E. rupincola Rchb. f. in Bonplandia, **5,** 38 (1857), in obs.

Cyrtopera oliveriana Rchb. f. in Flora, **64,** 329 (1881).

Eulophia oliveriana (Rchb. f.) Bolus in Journ. Linn. Soc. Lond. Bot. **25,** 185 (1889).

Graphorchis rupestris (Rchb. f.) Kuntze, Rev. Gen. Pl. 662 (1891).

It is difficult to see on what grounds Rolfe included *L. aequalis* and *E. oliveriana* in two different genera in his account of the orchids in Flora Capensis (**5,** iii, 48, 56). The type specimen of *L. aequalis* runs straight down in his key of the genus *Eulophia* to *E. oliveriana* and I fail to see any differences between the specimens cited by him under the two species. In addition the distributions agree very well with one another. It is interesting in connection with this that on the type sheet of *E. oliveriana* is written, in N. E. Brown's handwriting, " = E. aequalis ex Schlechter ". So far I have not been able to discover any published record of Schlechter's views on the matter, but it is possible that they were communicated to Brown in a letter.

Schlechter's reduction of *E. rupestris* Rchb. f. (Ann. Transv. Mus. **10,** 240 : 1924) is included in the above synonymy for the sake of completeness. Schlechter, like Rolfe, includes the species in his concept of *Lissochilus* but points out that it is one of those species with characters intermediate between the two concepts. Indeed it provides further evidence for the view that the two genera are best treated as one.

Without further investigation I am not prepared to give any opinion as to the identity of the plant described and figured by Bolus (Ic. Orch. Austr.-Afr. **2,** t. 10 : 1911) as *Eulophia oliveriana*. It is certainly quite different from the type specimen of *Cyrtopera oliveriana* Rchb.f. and from the other specimens referred to the species by Rolfe, particularly in the structure of the labellum.

It should be pointed out that *Lissochilus transvaalensis* Rolfe, though placed next to *L. aequalis* in Flora Capensis and compared with that species in the original description, is really referable to quite a different group in the genus *Eulophia*. The shape of the sepals, the venation of the petals, and the shape of, and lamellae on, the labellum show that it is a member of the group containing *E. horsfallii* (Batem.) Summerh., *E. porphyroglossa* (Rchb. f.) Bolus and other similar species with pinkish or purplish flowers. Unfortunately neither in the original description nor on the type sheet is the colour of the flowers mentioned.

Eulophia brevisepala (*Rendle*) *Summerhayes*, comb. nov.

Lissochilus brevisepalus Rendle in Journ. Bot. Lond. **33,** 195 (1895) ; Rolfe in Dyer, Fl. Trop. Afr. **7,** 73, 95 (1897).

L. rendlei Rolfe l.c. 73, 96 (1897).

This species, as indicated by Rolfe in his key (see references above), can be recognised by the strong development of the lateral lobes of the labellum, which often project above the apex of the column. The upper margins of these lobes are often bluntly toothed or at least very sinuate.

I can see no difference between it and the original specimens of *L. rendlei* which merely have rather longer lateral lobes and the keels on the

labellum not quite so well developed. The species is much more widely distributed than is indicated by Rolfe, occurring as far north as Uganda, but I have not yet worked out the range at all accurately.

Eulophia cucullata (*Sw.*) *Steud.* Nomencl. Bot. ed. 2, **1,** 605 (1840). *Lissochilus roscheri* Rchb. f., Otia Bot. Hamburg. 62 (1878).

In his original description Reichenbach allies his new species with *Eulophia cucullata* (*Lissochilus arenarius* Lindl.), while in the Flora of Tropical Africa (Dyer, Fl. Trop. Afr. **7,** 83 : 1897) Rolfe suggests that *L. roscheri* may be only a small-flowered form of the variable *L. arenarius*. Examination of the type sheet in the Reichenbach Herbarium, on which are the two gatherings cited by Reichenbach, confirms Rolfe's view and shows without doubt that Reichenbach's species is composed merely of small-flowered specimens of *Eulophia cucullata*.

There are several mistakes, however, in both Reichenbach's original account and in Rolfe's later treatment in the above cited book. These mistakes may easily cause confusion and attention is therefore drawn to them. In the first place the widths of the sepals and petals (tepals of Reichenbach) are quite incorrect in the original description. The sepals are 6 mm. wide while the petals are 11–13 mm. wide, that is, nearly as broad as long. Secondly the anther is said to be not horned, but this is not the case in the Roscher specimen, which otherwise is very similar to that collected by van Heuglin.

Rolfe introduces two more errors in his treatment of *Lissochilus* in the Flora of Tropical Africa. In the key to the species (p. 71) he distinguishes *L. roscheri* from *L. arenarius* on account of the " linear lip calli " of the former, while in his description of the species (p. 83) he states that there are 4 small keels in the labellum. These characters are nowhere mentioned in Reichenbach's description (which was all that Rolfe had seen) nor are they found in the type specimens. There are instead two more or less erect quadrate or obovate calli, with a low keel in front of them in the van Heuglin specimen.

Eulophia grantii (*Rchb. f.*) *Summerhayes*, comb. nov.

Lissochilus grantii Rchb. f. in Trans. Linn. Soc. Lond. Bot. **29,** 153 (1875).

L. oatesii Rolfe in Oates, Matabele Land, ed 2, 409 (1889).

L. ruwenzoriensis Rendle in Journ. Bot. Lond. **33,** 170 (1895).

L. shirensis Rendle, l.c. 171 (1895).

Examination of the type specimens of the above four species reveals no differences of any significance. The species is characterised by the broad blunt sepals, approximately two thirds as broad as long, and the three distinct keels in the lower part of the labellum middle lobe. The bracts are also shorter and less acute than in its nearest allies, e.g. *E. paivaeana*.

E. grantii has a wide distribution from the region of Ruwenzori in the north to Natal in the south but it appears to be much less common than *E. paivaeana*.

Eulophia livingstoniana (*Rchb. f.*) *Schltr.* in Ann. Mus. Col. Marseille, sér. iii. **1,** 172 (1913), in obs.

Lissochilus livingstonianus Rchb. f., Otia Bot. Hamburg. 114 (1881).

L. malangensis Rchb. f., l.c. (1881).

L. fallax Rchb. f., l.c. 115 (1881).

L. rutenbergianus Kraenzl. in Abh. Nat. Ver. Bremen, **7,** 257 (1882).

L. affinis Rendle in Journ. Bot. Lond. **33,** 193 (1895).

L. mediocris Rendle, l.c. (1895).

L. cornigerus Rendle, l.c. 194 (1895).

L. cornigerus var. *minor* Rendle, l.c. (1895).

Eulophia jumelleana Schltr. in Ann. Mus. Col. Marseille, sér. iii. **1,** 172, t. XVI, fig. 8–14 (1913).

E. robusta Schltr., l.c. 172 (1913), in obs., non Rolfe.

Lissochilus jumelleanus (Schltr.) Schltr. in Beih. Bot. Centralbl. **33,** ii. 421 (1915).

L. laggiarae Schltr. in Fedde, Repert. Spec. Nov. **15,** 332 (1918).

L. faradjensis De Wildem. in Bull. Jard. Bot. Brux. **6,** 83, t. XII, fig. 1–7 (1919).

Careful examination of the type specimens and/or descriptions on which the above names were based, together with other material comprising altogether over 80 gatherings, has convinced me that they represent merely the variations of a widely distributed and variable species. As understood here this species is distributed on the mainland of Africa from the southern Anglo-Egyptian Sudan and the Haut Uele district of the Belgian Congo in the north, southwards through Uganda, Kenya Colony, Tanganyika, the extreme east of the Belgian Congo, Northern Rhodesia and Nyasaland to Portuguese East Africa and Southern Rhodesia, extending westwards to Angola. It also occurs almost throughout Madagascar and in the Comoro Islands.

E. livingstoniana is clearly related to *E. cristata* (Sw.) Steud., differing from this species in the rather differently coloured flowers and the relatively broader labellum in which the veins are merely thickened to form raised ridges but do not bear finger-like or lamellae-like outgrowths. *E. cristata* has quite a different distribution, extending from Gambia in the extreme west eastwards throughout the northern savanna regions to the Anglo-Egyptian Sudan, Uganda and Abyssinia. The type specimen of *Lissochilus malangensis* Rchb. f., from Malange in Angola, approaches *E. cristata* in having the thickened veins on the labellum locally thicker to form somewhat irregular lumps, but in other respects it agrees with *E. livingstoniana.* In view of the respective distributions of the two species this specimen can scarcely represent a hybrid between them and indeed I have not seen any intermediate forms in the limited area where both species occur.

Although *E. livingstoniana* shows remarkable uniformity in vegetative characters, and in the general features of the inflorescence, the flowers exhibit a marked range of variation, especially as regards the labellum. In size the flowers vary from the smallest type in which the sepals and petals are only about 1 cm. long up to large-flowered specimens in which

the same organs are as much as 2·2 or 2·3 cm. in length. However, apart from the size there is very little variation in the tepals, excluding the labellum, except that the petals, which are usually nearly twice as long as broad, may sometimes be somewhat broader, or more rarely, considerably narrower. I have not, however, been able to correlate these petal differences with those in the labellum.

This latter organ exhibits a wide range of variations, with respect to (a) the total size, (b) the relative sizes of the basal and distal parts, (c) the amount of thickening of the veins on the distal part, or middle lobe, if it may be termed such. It is with respect to these variations that the greater part of the synonymy cited above has arisen, the species proposed being mostly based on variants in labellum characters. Examination of the material available shows that there is a complete gradation from one extreme to the other in each of the three characters mentioned above, and also that there is marked correlation between them. Specimens referred without doubt to *E. livingstoniana* consist on the whole of plants with relatively small flowers, the distal part (or middle lobe) of the labellum being narrower (sometimes considerably narrower) than the basal part and furnished with a number (up to 9 in extreme cases) of thickened veins in front of the usual two semi-circular calli which are situated in front of the spur opening. At the opposite extreme are the plants referred formerly to *Lissochilus mediocris* Rendle, which usually have large flowers (sepals 18 mm. or more in length) and a very broad middle lobe to the labellum on which the veins are scarcely thickened, the central calli often terminating more or less abruptly in front or decurrent only for a short distance. I have, however, seen all intermediates between these two extremes with the majority of specimens lying somewhere around the centre of variation.

Observations suggest that the marked correlation between the size of the labellum and the degree of thickening of the nerves is simply an expression of the relation between the material formed and the area available. On the small labella the additional material forms the thickened veins, but as the size of the labellum increases this material is spread out over a wider and wider area. The prominence of the thickenings consequently diminishes until in the largest labella the material is evenly distributed throughout the surface with practically no thickenings along the veins.

In some populations the flower size in individuals may well be determined by local differences in water supply or other habitat factors, but it seems, on analogy with other orchids, more likely to be genetic in character. This latter assumption seems essential in order to explain the relative abundance of large-flowered smooth-labellum forms (i.e. *L. mediocris*) in the north-western portion of the distribution of the species, and their rarity in more southern areas (e.g. the Rhodesias and Nyasaland) In fact there is some evidence of a cline in flower size, etc., from south-east to north-west, but this is by no means complete. Several of the "species" which have been proposed (e.g. *Lissochilus cornigerus* Rendle and *L. affinis* Rendle) are intermediate as regards the characters under discussion, and it is interesting to note that plants agreeing with these concepts are found for the most part in the intermediate regions or fit into a distribution of an intermediate type.

The material of *E. livingstoniana* occurring in Madagascar and the Comoro Islands has previously been referred to a distinct species, *Lissochilus rutenbergianus* Kraenzl. (see Perrier de la Bâthie in Humbert, Fl. Madag. Orch. **2,** 9, t. XLII, fig. 7–11 : 1941). I have seen six gatherings from these two regions, including *Baron* 5982 which is cited in the above mentioned account, and I have no doubt whatever that they are all referable to *E. livingstoniana*. Judging from the original description of *L. rutenbergianus* and the illustration of the species cited just above, as well as that of *Eulophia jumelleana* Schltr. (see reference in synonymy), *E. livingstoniana* shows much the same range of variation in Madagascar as on the mainland of Africa, except perhaps for the extreme variants discussed above under *Lissochilus mediocris*. I am still a little doubtful about *E. jumelleana* Schltr. which appears from the illustration to be intermediate in structure between the present species and *E. cristata* (Sw.) Steud., but Schlechter himself refers his species to *Lissochilus rutenbergianus* (Fedde, Repert. Spec. Nov. Beih. **33,** 258 : 1925) and states that the latter is closely allied to *L. livingstonianus* Rchb. f. (*E. livingstoniana* (Rchb. f.) Schltr.).

Eulophia ovalis *Lindl.* Comp. Bot. Mag. **2,** 202 (1837).

E. barbata (Thunb.) Spreng. Syst. Veg. **3,** 720 (1826) ; Lindl. Gen. and Sp. Orch. 184 (1833), partim ; nomen illegit.

When Sprengel transferred Thunberg's *Limodorum barbatum* to the genus *Eulophia* he included as a synonym *Serapias capensis* L. and he should therefore have adopted the name *Eulophia capensis* for the species. (The name *E. capensis* (L.) Bolus based on *Satyrium capense* L., which is the correct name for the plant generally known as *E. aculeata* (Linn. f.) Spreng., was not proposed until 1882). Consequently *E. barbata* (Thunb.) Spreng. is an illegitimate name and must be rejected. Similarly Lindley's use of the name in 1833 is also illegitimate since he also includes *Serapias capensis*. Four years later he described as a distinct species *E. ovalis*, which is by common consent accepted as conspecific with *E. barbata* (Thunb.) Spreng. The name *E. ovalis* is therefore the correct name for this species.

Eulophia paivaeana (*Rchb. f.*) *Summerhayes*, comb. nov.

Lissochilus paivaeanus Rchb. f. in Flora, **48,** 187 (1865).

On careful examination of all the available material of the yellow-flowered *Eulophias* with more or less orbicular petals, and sepals either as long as or longer than the petals (nos. 50–65 in Rolfe's treatment of the genus *Lissochilus* in Dyer, Flora of Tropical Africa, **7,** 72–73, 89–93 : 1897), I have come to the conclusion that a great number of the species recognised by Rolfe are conspecific and must bear the above earliest name. The plant originally described as *Lissochilus krebsii* Rchb. f. seems to me to be identical with the earlier *Eulophia streptopetala* Lindl., which is distinct from *E. paivaeana*. *Eulophia rueppelii* (Rchb. f.) Summerh. and *E. grantii* (Rchb. f.) Summerh., dealt with elsewhere in this paper, are other distinct species of this group. A further quite distinct species is *E. stenophylla* Summerh. (*Lissochilus micranthus* Kraenzl.) (see Kew Bull. **1949,** 434). Some of the other species in Rolfe's treatment are still

doubtful but they cannot affect the nomenclature of the plant dealt with here.

Analysis of the material at Kew referable to *E. paivaeana* in the broad sense (about 100 gatherings altogether) shows that it can be divided into two geographical groups which differ in average flower size and in the details of the crests on the labellum. I am accordingly treating these as subspecies, the typical subspecies extending from the eastern Cape Province northwards to Tanganyika Territory and Angola, while the subspecies *borealis* continues the distribution in northern Tanganyika to Kenya, Uganda and the eastern Belgian Congo. A formal treatment of these two subspecies follows.

subspecies **paivaeana,** nom. nov.

Lissochilus graefei Kraenzl. in Gard. Chron. ser. 3, **11,** 749 (1892).

L. papilionaceus Rendle in Journ. Bot. Lond. **33,** 170 (1895).

L. carsoni Rolfe in Dyer, Fl. Trop. Afr. **7,** 90 (1897).

L. ukingensis Schltr. in Engl. Bot. Jahrb. **53,** 591 (1915).

Type specimen :—Angola, Huilla, *Welwitsch* 731.

The typical subspecies is characterised by larger flowers (intermediate sepal 12–19 mm. long with an average of about 15 mm.) and broader lobes to the labellum, the middle lobe of which is furnished with three crests, the central one extending nearly to the apex. The degree to which the two lateral crests are developed shows some variation, the crests being relatively long and separate from the central crest in many specimens whereas in others they are poorly developed and close to the central one.

As mentioned above, this subspecies has a southern distribution occurring in southern Tanganyika Territory, Nyasaland, the Rhodesias, Angola, Mozambique, the Transvaal and Natal, with a single gathering from the Kentani district in the eastern Cape Province. It includes most of the specimens referred to *Lissochilus krebsii* Rchb. f. in the Flora of Tropical Africa (**7,** 91 : 1897) and Flora Capensis (**5,** iii, 58 : 1912).

subspecies **borealis** *Summerhayes*, subsp. nov. ; a typo floribus minoribus (sepalo intermedio 9·5–16 mm. longo), labelli lobo intermedio semper unicristato differt.

Lissochilus oliverianus Rchb. f. in Trans. Linn. Soc. Lond. Bot. **29,** 154 (1875).

L. kirkii Rolfe in Dyer, Fl. Trop. Afr. **7,** 92 (1897).

Type specimen :—Uganda, Kampala, Lugogo Plantation, June 1932, *Eggeling* 801.

The differences between this subspecies and the typical subspecies are given in the diagnosis above. It should be added that the difference in flower-size is usually quite evident, the length of the intermediate sepal in subsp. *borealis* normally ranging between 11 and 15 mm., whereas in subsp. *paivaeana* the sepals in 50 per cent. of the specimens exceed the latter figure. The single central crest on the labellum is made more prominent than would otherwise be the case by the marked convexity of the lower portion of the middle lobe.

As the epithet indicates this subspecies occupies the northern parts of

the general distribution of the species. It is evidently a common plant in Kenya Colony and Uganda, and in the Parc National Albert and adjoining regions of the Belgian Congo. It also occurs less commonly in northern Tanganyika Territory.

Eulophia pyrophila and its allies.

The group of small flowered *Eulophias* allied to *E. pyrophila* (Rchb. f.) Summerh. has always presented considerable difficulties in determination. Rolfe placed five species at the beginning of his treatment of the genus *Lissochilus* in the Flora of Tropical Africa (**7,** 70, 74, 75 : 1897), together with two other species (*L gracilior* Rendle and *L. verrucosus* Rolfe) which belong to quite other circles of affinity. He also referred one species (*E. leonensis* Rolfe) to *Eulophia* proper. Two species of the same group are included in Flora Capensis, while several other species have been described singly in various publications.

Many of these species look extremely like one another, while the characters used for distinguishing them seemed scarcely adequate for specific distinction. I have therefore re-investigated the whole of the material of the group represented at Kew (about 100 sheets altogether) and my conclusions are given below. Several forms, especially from the region of Angola and the Rhodesias, require further investigation when more material is available.

Eulophia pyrophila (*Rchb. f.*) *Summerh.* in Kew Bull. **1947,** 132 (1948).

Lissochilus pyrophilus Rchb. f. Otia Bot. Hamburg. 65 (1878).

L. parvulus Rendle in Journ. Bot. Lond. **33,** 196 (1895).

Eulophia tanganyikae Kraenzl. in Bull. Soc. Bot. Belg. **38,** 216 (1900).

E. ledermannii Kraenzl. in Engl. Bot. Jahrb. **48,** 394 (1912).

The above combination has been attributed to Schlechter but it was not validly published in the two places where it had appeared previous to the reference cited above.

Careful examination of type specimens of all the above show them to be conspecific. At first I thought it was possible to maintain *L. parvulus* as a distinct species but further study has shown this course to be untenable.

E. pyrophila, like its close ally *E. sordida* Kraenzl., is recognisable by its very short spur. The sepals are strap-shaped, about 3·5–7 mm. long, while the petals, which are rather longer (4·5–8 mm. long), vary in shape from narrowly to broadly elliptical or very broadly ovate. The labellum is very distinctly 3-lobed, the rounded triangular side lobes being adnate to the very base and foot of the column but standing out at right angles to the middle lobe when the labellum is quite spread out. There are a variable number of swollen crests in the basal part of the middle lobe, this number varying owing to the different degree of development of the more lateral crests and the extent of fusion of the more central ones, Towards the base these crests are progressively less well-developed and transversely divided into a number of short bars. In some specimens, however, the crests are thickened again immediately in front of the spur opening to form a sort of verrucose callus, the development of this being decidedly variable from one individual to another.

The species has a wide distribution in Tropical Africa, occurring in the French Cameroons and in East Africa from the Anglo-Egyptian Sudan southwards to Southern Rhodesia and Portuguese East Africa. It also occurs south of the Congo forest region in Angola, the southern Belgian Congo and Northern Rhodesia. It seems, however, to be comparatively rare in the western parts of the continent.

From Northern Rhodesia I have seen a number of gatherings with smaller flowers of a slightly different texture and no development of the basal callus on the labellum. Whether this represents a distinct species or not yet remains to be seen. In certain respects these specimens approach *E. arenicola* Schltr.

Eulophia sordida *Kraenzl.* in Engl. Bot. Jahrb. **33,** 67 (1902).

For some time I have been doubtful of the specific distinction of this species, which is very similar in appearance to *E. pyrophila* (Rchb. f.) Summerh., dealt with just above. On further examination, however, I am satisfied that it can be separated on the characters of the labellum. In *E. pyrophila* the lateral lobes are basal, relatively large and stand out at right angles when the labellum is flattened. In *E. sordida*, on the other hand, the lateral lobes are less distinctly separated from the middle lobe, the free end being much smaller and situated just below the middle of the labellum as a whole. On flattening-out the lateral lobes only diverge slightly from the middle lobe and consequently the labellum does not appear so markedly 3-lobed as in the other species.

E. sordida is at present known only from the Gold Coast and Togo.

Eulophia microceras *(Rchb. f.) Summerhayes*, comb. nov.

Lissochilus microceras Rchb. f. Otia Bot. Hamburg. 115 (1881).

? *L. heteroglossus* Rchb. f., l.c.

I am still not quite certain whether this species is really distinct from the more widely distributed *E. pyrophila* (Rchb. f.) Summerh. The species is characterised by the relatively long and narrow perianth segments, the petals being elliptical or narrowly elliptical, and especially by the well-developed though short more or less incurved spur. In the structure of the labellum the species agrees in general with *E. pyrophila*. *E. microceras* has so far been found only in Nyasaland.

The type specimen of *Lissochilus heteroglossus* Rchb. f. is so fragmentary that it is almost impossible to see the structure of the flowers. From a sketch of Reichenbach on the sheet and from the general appearance of the plant it is difficult to see how it really differs from *E. microceras*. Rolfe's key difference (Fl. Trop. Afr. **7,** 70 : 1897) of a quarter of a line (0·5 mm.) in the length of the spur seems hopelessly inadequate as a specific distinction ; the differences in his two descriptions are all matters of degree and none appears to be of specific value.

In the species already dealt with the spur of the labellum is usually not very prominent though it is more obvious in *E. microceras* than in the other species. The species now following all have the spur much more obviously developed. In some species this is associated with a marked development of the foot of the column which, together with the adnate

lateral lobes of the labellum, forms the broader basal part of the apparent spur. This basal portion may be as long as, or even longer than, the apical part which is the spur proper.

Eulophia leonensis *Rolfe* in Dyer, Fl. Trop. Afr. **7,** 51 (1897).

This species, curiously enough, was included by Rolfe in *Eulophia* whereas the other known species of the same affinity were placed by him in *Lissochilus*, as stated above. *E. leonensis* may be distinguished by the relatively long slender spur and the broad leaves which are usually just developing at the time when the flowers are open. In this species, however, the foot of the column is relatively short and therefore the true spur forms the greater part of the apparent spur. The petals, which are orbicular-ovate in shape, are in this species a little shorter than the oblanceolate sepals. The species occurs in the northern savannah region from Gambia in the west to north-western Uganda in the east.

Eulophia clitellifera (*Rchb. f.*) *Bolus* in Journ. Linn. Soc. Lond. Bot. **25,** 184 (1889) (" *clitellifer* ").

Lissochilus clitellifer Rchb. f. in Linnaea, **20,** 687 (1847).

L. pulchellus Rendle in Journ. Bot. Lond. **33,** 196 (1895).

L. rehmannii Rolfe in Dyer, Fl. Cap. **5,** iii, 55 (1912).

Only after the examination of over 30 gatherings referable to the above three " species " have I been able to decide that they represent one widely spread species. The flowers here are considerably larger than in any of the species already dealt with, the perianth members varying from 6–9 mm. in length, while the total length of the labellum (including the spur) may be as much as 16 mm., though usually it lies between 11 and 14 mm. In *E. clitellifera* also the foot of the column is very well developed, while the lateral lobes of the labellum are united to the base of the column as well as to the foot, so that a relatively long apparent spur is always produced. The length of the true spur, however, is rather more variable, as is also its diameter. In the extreme southern form of the species occurring in Natal this true spur is short and blunt whereas farther north individuals with longer and narrower spurs became much commoner. These include the plants named *L. rehmannii* by Rolfe. The type specimen of *L. pulchellus* Rendle from northern Tanganyika Territory, however, has a rather short spur. All intermediates in spur length can be found, while this character does not seem to be correlated with either petal-shape or the varying nature of the crests on the labellum. The petals vary in shape from almost orbicular to elliptical and are always appreciably longer than the sepals. The crests on the labellum are very similar in general features to those found in other species of the affinity ; they vary somewhat in numbers (usually 7–9, but rarely only 5) and also in the extent to which they terminate more or less sharply in front. In some specimens the labellum is markedly convex in the region of the crests.

Records show that the species is distributed from the extreme south of the Anglo-Egyptian Sudan southwards through Uganda, Tanganyika Territory, the Katanga region of the Belgian Congo, the Rhodesias and

the Transvaal to Natal, from which region it was originally described. It is usually a grassland or savanna plant, occurring, like its allies, frequently on recently burnt areas.

Eulophia fractiflexa *Summerhayes*, nom. nov.

Lissochilus flexuosus Schltr. in Fries, Wiss. Ergebn. Schwed. Rhod.-Kongo-Exped., 1911–12, **1,** Bot. 245, fig. 24 (1916).

Owing to the existence of *Eulophia flexuosa* (Rolfe) Kraenzl., a synonym of *Polystachya flexuosa* (Rolfe) Schltr., the trivial *flexuosa* cannot be used for the *Eulophia* dealt with here. I therefore propose the epithet *fractiflexa* to indicate the weakly zigzag rhachis from the the epithet *flexuosus* was originally derived. *E. fractiflexa* is very closely allied to *E. clitellifera* (Rchb. f.) Bolus but may be distinguished by the nature of the crests on the labellum. In the present species these crests just in front of the mouth of the spur are elongated upwards to form a group of forward-pointing teeth. In *E. clitellifera*, on the other hand, the crests become gradually lower and lower as one passes towards the mouth of the spur, finally gradually dying away; there are no tooth-like projections in the lower part.

E. fractiflexa is known only from North-Eastern Rhodesia and from the adjacent Katanga Province of the Belgian Congo.

Eulophia arenicola *Schltr.* in Warb. Kun.-Samb. Exped. 217 (1903).

This species is very like a small edition of *E. clitellifera* (Rchb. f.) Bolus, the flowers being considerably smaller with a relatively short but clearly defined spur to the labellum. The column foot is well-developed also in this species. The lateral lobes of the labellum here are more or less triangular in shape and adnate to the column to such an extent that only the very tips are free. In *E. clitellifera* the more or less quadrate lateral lobes are united with the base of the column only.

E. arenicola has been collected in Angola, North-Western Rhodesia and in the Katanga Province of the Belgian Congo. I have no evidence as yet that it is associated with burnt areas ; the various collectors simply state that it occurs in bare rocky places or on dry slopes of vleis.

Eulophia rueppelii (*Rchb. f.*) *Summerh.* ex Gard. Chron. ser. 3, **107,** 220 (1940).

Lissochilus rueppelii Rchb. f. in Linnaea, **20,** 686 (1847), in obs., et l.c. **22,** 865 (1849).

L. erythraeae Rolfe in Dyer, Fl. Trop. Afr. **7,** 91 (1897).

Examination of specimens and descriptions of the above species shows that they are conspecific. The characteristic feature of this species is the three very prominent keels or crests which are continued nearly to the apex of the lip. These keels are much more distinct and well-developed than in any other member of this group of yellow-flowered *Eulophias*.

Eulophia shupangae (*Rchb. f.*) *Kraenzl.* apud Gilg in Engl. Pflanzenw. Ost.-Afr. **C,** 157 (1895).

Cyrtopera shupangae Rchb. f. Otia Bot. Hamburg. 116 (1881).

C. papillosa Rolfe in Kew Bull. **1893,** 336 (1894).

C. holstiana Kraenzl. ex Engl. in Abh. Preuss. Akad. Wiss. **1894,** 41, nomen.

Eulophia chrysantha Schltr. in Engl. Bot. Jahrb. **20,** Beibl. 1. 2 (1895).

E. papillosa (Rolfe) Schltr. l.c. 25 (1895), in obs.

E. missionis Rendle in Journ. Bot. Lond. **33,** 168 (1895).

E. holstiana Kraenzl. apud Gilg in Engl. Pflanzenw. Ost.-Afr. **C,** 157 (1895).

E. graciliscapa Schltr. in Engl. Bot. Jahrb. **24,** 418 (1897).

E. johnstoni Rolfe in Dyer, Fl. Trop. Afr. **7,** 66 (1897).

E. lata Rolfe, l.c. 67 (1897).

E. panganiana Kraenzl. in Engl. Bot. Jahrb. **28,** 169 (1900).

E. flammea Kraenzl., l.c. **48,** 395 (1912).

E. ochracea Schltr. in Engl. Bot. Jahrb. **53,** 583 (1915).

E. brunneo-rubra Schltr., l.c. 583 (1915).

R. durbanensis Rolfe in Kew Bull. **1917,** 83.

E. baoulensis A. Chev. Expl. Bot. Afr. Occ. Franç. **1,** 613 (1920), nomen.

E. propinqua Hutch. in Kew Bull. **1921,** 401.

It is difficult to know exactly how to deal with the assemblage of plants to different parts of which the above names have been given by various botanists. The group is a very variable one with an immense geographical range stretching from Sierra Leone in the west to Kenya in the east and southwards through eastern Africa to Port St. John in the eastern Cape Province. After careful consideration I have decided for the present to look upon the group as representing a single variable species which must bear the earliest epithet *shupangae*.

The species is an easily recognised one on account of the vegetative characters, which are strikingly constant throughout the whole geographical range, the usually complete envelopment of the peduncle in a series of tightly fitting overlapping pale brown sheaths and the comparatively short dense inflorescence. The leaves show slight variation in length and breadth but are usually about 1–1·5 cm. broad, while in a few specimens the sheaths of the peduncle do not completely cover it.

It is in the flowers, however, that the greatest variations occur, especially in the labellum. The sepals are usually broadly lanceolate and more or less acute while the petals are normally a little shorter and more obtuse. The labellum is three-lobed with the middle lobe always longer than the laterals and normally much larger. In the lower part of the disc there are two short keels which terminate in semicircular calli between the side-lobes. These calli may be quite entire, they may be toothed in front or they may even resemble two series of molar teeth. In front of the calli are numerous hair-like outgrowths arising from the greater part of the middle lobe. The relative lengths and sizes of the lateral and middle lobes show considerable differences in different plants and in different regions but even the most extreme forms are linked by intermediates. The development of the spur also shows marked variation from plants in which there is practically no proper spur up to those in which the spur is 3 mm. or more long. Rolfe in the Flora of Tropical Africa (**7,** 47–50 : 1897) uses the nature of the spur for distinguishing

major groups within the genus, but this is insufficient in itself. Most of the species in his second group with " spur conical, saccate or obsolete " can be distinguished from the rest of the African species by quite other characters. On the other hand, *E. shupangae* is clearly related to certain species in his first group.

Examination of the welter of forms included in the above concept shows, however, that three main groups can be recognised, these three groups having more or less distinct geographical ranges. As the differences between them are not very clear-cut, however, I do not propose to treat them formally as subspecies though further investigations may show that such a treatment is the correct one. These groups are as follows :—

Group A. This includes the type specimen of the species and also the South African plants previously called *E. papillosa* (Rolfe) Schltr. and *E. durbanensis* Rolfe. The group is characterised by the poor development of the lateral lobes and the large almost orbicular or broadly obovate middle lobe of the labellum. This latter is usually markedly lacerate-dentate along the lower margins and more or less widened from a narrow base. The spur is very weakly developed. In the South African plants the side lobes of the labellum are brownish in colour, the remainder of the flower being yellow. Farther north an increasing proportion of plants are yellow throughout with orange hairs on the labellum, or are brown or chocolate in tint, this colour being sometimes restricted to the outer surfaces while in other plants the flowers are brownish throughout. This group also includes *E. graciliscapa* Schltr. while *E. lata* Rolfe is a rather broad-sepaled form with apparently deep reddish or chocolate-coloured flowers, but I can see no other significant differences. The group is southern in distribution, occurring in the eastern Cape Province, Natal, the Transvaal, Rhodesia, Portuguese East Africa and Nyasaland, in most of which areas this is the only group present. Scattered gatherings referable to this group, e.g. *E. johnstoni* Rolfe and *E. holstiana* Kraenzl., have also been collected at various places in Tanganyika Territory and as far north as the Imatong mountains on the Sudan-Uganda border.

Group B. This group includes the plants referred formerly to *E. propinqua* Hutch. The characteristic features are the uniformly smaller flowers (sepals usually scarcely reaching 1 cm. in length) and the comparatively short and narrow middle-lobe to the labellum. The lateral lobes are consequently relatively longer and larger. The middle lobe itself is more or less oblong or elliptical, not much widened towards the front and usually with almost entire margins. The colour of the flowers varies from yellow to brownish or chocolate, that is, a range similar to that in Group A. The spur is quite short, as in that group. Group B occurs throughout West Africa from Sierra Leone to Nigeria and the Cameroons and eastwards to western Kenya Colony. *E. brunneo-rubra* Schltr., from southern Tanganyika, also seems referable to this group though the flowers are above the average in size.

Group C. This is the least clearly defined of the groups and, as it occupies the central region of the whole distributional area of the species, that is eastern Belgian Congo, Uganda and Tanganyika, it may really represent the original range of genotypes from which the northern and southern

groups have been segregated. It is considerably more variable than either of Groups A or B, both in flower-size and colour and in the structure of the labellum. It does, however, exhibit in many gatherings a feature not found in either of the other groups, namely, the elongation of the spur. As already mentioned this may be up to 3·5 mm. in length though a more usual length is about 2 to 2·5 mm. Plants with such spurs may sometimes be found growing with others in which the spur is quite short. The group includes *E. missionis* Rendle and *E. ochracea* Schltr. Apart from the spur the labellum appears to be intermediate in structure between Groups A and B, the middle lobe being usually narrower than in Group A but longer and more dentate than in Group B. The lateral lobes are also intermediate in size and position.

The group is best represented in Tanganyika Territory but it also occurs in Nyasaland to the south and in Uganda and the volcanic region of the Albert National Park in the Belgian Congo to the north. I have seen a single gathering referable to this group from the Bamenda region of the British Cameroons.

It is clear from a study of the material available that further progress in the understanding of *E. shupangae* in the broad sense can only be obtained by the study of populations in the field and possibly also by cytological investigations. In many respects the types of variation and the distributions of the groups are reminiscent of those of the European dactylorchids, though the plants themselves are very unlike in appearance and quite remote taxonomically.

Graphorkis Thouars

This name was first proposed by Thouars in 1809 (Nouv. Bull. Sci. Soc. Philom. Par. **1,** 318) in a general account of the genera of Mascarene orchids. A conspectus is provided by him defining the various major groups and under these each genus is furnished with a short differential diagnosis. The description of *Graphorkis* reads thus :—

> " n. Graphorkis (*Grapho* gr. j'écris). Labelle ventru, terminé par un Eperon ou bosse très-courte. Il comprend plusieurs espèces remarquable par l'élégance de leur port et la beauté de leurs Fleurs agréablement tachetées, ce qui a valu l'épithète de *Scriptum* à l'une d'elles, décrite et figurée par Rumphius, rapportée par Linné à son Genre *Epidendrum*, et par Swartz au *Cymbidium* ".

There seems little doubt that the generic name *Graphorkis* is validly published, even if the description is admittedly rather short. As the original account also contains no named species which was already the type of a generic name the name *Graphorkis* is also quite legitimate. It will be seen from the above account that the genus as conceived by Thouars contained *several* species one of which was apparently the Malaysian plant now known as *Grammatophyllum scriptum* (L.) Bl. (*Epidendrum scriptum* L.). The word " apparently " is used because it is not certain whether Thouars *really* meant to include this species, or was merely referring to a Mascarene plant which he thought was identical with it. It is unfortunate that this species, the only one referred to specifically, does not agree with the original diagnosis, since there is not the slightest sign of a spur or boss in the labellum of *Grammatophyllum scriptum*.

Thouars' account of the Mascarene Orchids referred to above was amplified, and to a certain extent modified, in his later work entitled "Flore des Iles Australes de l'Afrique, Famille des Orchidées" published in 1822.

Here he again presents the genera already defined in his previous paper in the form of a sort of combined key and conspectus in which each proposed generic name is followed by a list of the species included, under the binary names which would be given by the older taxonomists. It must be understood that Thouars was somewhat of a revolutionary as regards both nomenclature and taxonomy and that explains the hotch-potch of different names for the same plant which is found in this book. Most of the species are also illustrated with analyses in the plates which follow the rather brief text.

In this account the genus *Graphorkis* (now spelt *Graphorchis*) contains five species, three of which (*Limodorum pulchrum*, *L. concolor* and *L. scriptum*) have the labellum "terminé en bosse ou Éperon" and therefore agree with the original description, while the other two (*Limodorum flabellatum* and *L. plantagineum*) lack this feature. *Limodorum scriptum*, shortly described and well figured (tt. 46 and 47) in this book, is evidently quite a different plant from *Epidendrum scriptum* L. with which Thouars had originally identified it. It seems probable that Thouars had realised his mistake, since he makes no reference to *Epidendrum scriptum* L. except on the coloured plate (published separately) which had presumably been prepared previously.

In 1833 Lindley (Gen. & Sp. Orch. 181, 182) transferred the three species of *Limodorum* mentioned above (*pulchrum*, *concolor* and *scriptum*) to the genus *Eulophia* where they remained until 1887, the name *Graphorkis* being in abeyance all this time. In 1887 Pfitzer (Entw. Natürl. Anordn. Orchid. 85), in the course of his studies of the orchids for Engler and Prantl's Natürlichen Pflanzenfamilien (**2,** abt. 6, 183 : 1888) created the genus *Eulophiopsis*, differing from *Grammatophyllum*, among other genera, by the labellum possessing a distinct spur. The type species of the genus is stated by Pfitzer to be *E. scripta* (Lindl.) Pfitz., clearly based on *Eulophia scripta* Lindl. which in its turn is based on *Limodorum scriptum* Thouars.

The name *Graphorkis* (*Graphorchis*) was revived, however, by Otto Kuntze in 1891 (Rev. Gen. Pl. 661–663) as the correct name for *Eulophia*. Among the new combinations made by him are those relating to the five species of *Limodorum* published by Thouars. In the course of his discussion Kuntze suggests, that in view of the coloured plate of *Limodorum scriptum* published by Thouars, this species should be considered as the type of the genus *Graphorkis* ; this must therefore be considered as the lectotype species of the genus. This view is quite in agreement with all the information available and there seems to be no reason for disputing Kuntze's choice.

For those taxonomists who consider *Eulophiopsis* to be merely a section of the genus *Eulophia* no difficulty arises from Kuntze's revival of *Graphorkis*, since the generic name *Eulophia* is conserved specifically against *Graphorkis* which ever way the name is spelt. The case in otherwise if *Eulophiopsis* is maintained as a distinct genus, since the type species of *Eulophiopsis* is the same as that of *Graphorkis* and the name *Eulophiopsis* is not included

in the list of conserved names. In view of the divergence of opinion among orchidologists as to the generic distinctness of *Eulophiopsis*, the small number of species in the genus, and the relatively few references to it in the literature, there seems to be no justification for proposing the name for conservation. The name *Graphorkis* will therefore have to be substituted for *Eulophiopsis* as the correct name of the genus concerned*. The relevant synonymy is set out below together with a list, with synonymy, of the recognised species, so far as I have been able to determine these without carrying out a detailed revision of the genus.

Graphorkis *Thouars* in Nouv. Bull. Sci. Soc. Philom. Par. **1,** 318 (1809), excl. ic. Rumph., et Orch. Iles Austr. Afr. tabl. synop. 2, tt. 43–47 (1822), excl. Limodoro flabellato, L. plantagineo et L. pulchro ; O. Kuntze, Rev. Gen. Plant. 662 (1891), pro minime parte.

Eulophiopsis Pfitzer, Entw. Natürl. Anordn. Orchid. 85, 105 (1887) ; et in Engl. & Prantl, Natür. Pflanzenfam. **2,** abt. vi, 183 (1888) ; Schlechter, Die Orchideen, ed. 1, 348 (1914), in Beih. Bot. Centralbl. **33,** abt. ii. 422 (1915) et in Fedde, Repert. Spec. Nov. Beih. **33,** 266 (1925); Summerhayes in Hutch. & J. M. Dalz. Fl. West Trop. Afr. **2,** 446 (1936). Species lectotypica : *G. scripta* (Thouars) Kuntze.

1. **Graphorkis concolor** (*Thouars*) *Kuntze*, Rev. Gen. Pl. 662 (1891).
 Limodorum concolor (Thou.) Orch. Iles Austr. Afr. tabl. synopt. 2, t. 45 (1822).
 Eulophia concolor (Thou.) Lindl. Gen. & Sp. Orch. 181 (1833).
 Eulophiopsis concolor (Thou.) Schltr. in Beih. Bot. Centralbl. **33,** ii. 422 (1915).

2. **G. ecalcarata** (*Schltr.*) *Summerhayes*, comb. nov.
 Eulophiopsis ecalcarata Schltr. in Beih. Bot. Centralbl. **34,** ii. 332 (1916).
 Lissochilus ecalcaratus (Schltr.) H. Perrier in Humbert, Fl. Madag. Orch. **2,** 36 (1941).

3. **G. lurida** (*Swartz*) *Kuntze*, Rev. Gen. Pl. 662 (1891).
 Limodorum luridum Sw. in Schrad. Neues Journ. **1,** 87 (1805).
 Angraecum luridum (Sw.) Lindl. in Trans. Hort. Soc. Lond. **6,** 86 (1826).
 Eulophia lurida (Sw.) Lindl. Gen. & Sp. Orch. 182 (1833).
 E. longicollis Lindl. in Journ. Linn. Soc. Lond. Bot. **6,** 132 (1862).
 E. virilis Lindl., l.c.
 Eulophiopsis lurida (Sw.) Schltr. Die Orchid. 348 (1914).

4. **G. medemiae** (*Schltr.*) *Summerhayes*, comb. nov.
 Eulophia medemiae Schltr. in Ann. Mus. Col. Marseille, sér. iii, **1,** 173, tab. XII, fig. B 7–13 (1913).
 Eulophiopsis medemiae (Schltr.) Schltr. in Beih. Bot. Centralbl. **33,** ii. 422 (1915).
 Lissochilus medemiae (Schltr.) H. Perrier in Humbert, Fl. Madag. Orch. **2,** 38 (1941).

* I should like here to express my indebtedness to Mr. J. E. Dandy for help in considering the problem of the correct name for this genus. The responsibility for the above decision is, however, entirely mine.

5. **G. scripta** (*Thouars*) *Kuntze*, Rev. Gen. Pl. 662 (1891).
Limodorum scriptum Thouars, Orch. Iles Austr. Afr. tabl. synopt. 2, tt. 46–47 (1822).
Eulophia scripta (Thou.) Lindl. Gen. & Sp. Orch. 182 (1833).
Cymbidium scriptum (Thou.) Steud. Nomencl. Bot. ed. 2, **1,** 460 (1840), in syn., non. (L.) Sw.
Eulophiopsis scripta (Thou.) Pfitz. in Engl. & Prantl. Natür. Pflanzenfam. **2,** abt. vi, 183 (1888).
Lissochilus scriptus (Thou.) H. Perrier in Humbert, Fl. Madag. Orch. **2,** 37 (1941).

Angraecum poöphyllum *Summerhayes*, nom. nov.
A. graminifolium (Ridl.) Schltr. in Beih. Bot. Centralbl. **33,** ii. 434 (1915), non *A. graminifolium* (Kraenzl.) Engl. (1908).

Owing to the earlier *A. graminifolium* (Kraenzl.) Engl., based on the East African *Listrostachys graminifolia* Kraenzl., which I have referred doubtfully to the genus *Ypsilopus* (see Kew Bull. **1949,** 440), this name cannot be used for the Madagascan plant originally described as *Mystacidium graminifolium* Ridl.

I therefore propose the epithet *poöphyllum*, which has the same meaning, for this latter plant, as the name *Angraecum graminifolium* (Ridl.) Schtr. is a later homonym.

Robert Pilger

By the death of Professor Robert Pilger on the 9th January, 1953, Kew has lost a most valued correspondent; one who on numerous occasions aided the work of this establishment in various ways, but especially by giving his critical judgment on types and other important specimens in the Berlin Herbarium. Pilger was born on the 3rd July, 1876, on the island of Heligoland. He was educated in Greiz from 1885 to 1892, and at Berlin-Charlottenburg from 1892–1894. Later he studied in Berlin, where he took the degree of Doctor of Philosophy in February, 1898.

In December, 1898, Pilger accompanied Dr. Hermann Meyer on an expedition to the interior of Brasil (Matto Grosso), a country he visited again in 1934 to attend the unveiling of the memorial to Martius, Eichler and Urban. After his return in January, 1900, he became a Scientific Assistant-worker in the Botanical Museum, Berlin, an Assistant in the Botanic Garden in April, 1902, a Curator of the same institution in February, 1909, Assistant Director of the Botanic Garden and Museum in June, 1921, and finally Director in 1945, on the death of Professor Diels. During this long connection with the Berlin Herbarium, he carried out a vast amount of research on such diverse groups as the *Algae*, *Coniferae*, *Plantaginaceae* and *Gramineae*, publishing the results of his studies in an extensive series of papers in the "Notizblatt", "Jahrbücher", etc., as well as in several complete volumes of the "Pflanzenreich" and "Pflanzenfamilien". He acted as editor of Hedwigia (1921–1931), Botanische Jahrbücher (1945–52) and Bibliotheca Botanica (1945–52). In addition to this very active life of research, he held several academic appointments from 1907 onwards, until he became Honorary Professor at the Free University of Berlin in August, 1949. C.E.H.

NOTES ON AFRICAN ONAGRACEAE AND TRAPACEAE.

J. P. M. Brenan.

Unless otherwise localised, specimens are to be found in the Herbarium of the Royal Botanic Gardens, Kew. Abbreviations for other herbaria follow Dr. Lanjouw's standardised list published in Chron. Bot. **5**, 143 (1939).

Epilobium stereophyllum *Fres.* var. **kiwuënse** (*Loes.*) *Brenan*, comb. nov.

Epilobium kiwuënse Loes. in Mildbr., Wiss. Ergebn. Deutsch. Zentr.-Afr. Exped. 1907–1908 **2**, 588 (1913).

Jussiaea *L.* and **Ludwigia** *L.*

The tropical African species of *Ludwigia*, including *L. perennis* L., the type of the genus, are anything but a natural assemblage, separated from *Jussiaea* solely by the stamens being in one not two whorls. The natural affinities, commonly based on the fruit and seeds, appear to cut across the current conception. Thus *Ludwigia abyssinica* A. Rich. is clearly related to *Jussiaea linifolia* Vahl, and *L. jussiaeoides* Desr. is a *Jussiaea* in all but its stamens. In other words it seems that, at least among our species, the loss of a whorl of stamens has happened more than once during the evolutionary history of *Jussiaea*. It might be maintained that *Jussiaea* should be split into smaller genera based on fruit and seed characters, but this would destroy the homogeneity of *Jussiaea*, which is, I decidedly feel, a natural genus.

Since reaching the above conclusions, I find that Perrier de la Bâthie, revising the *Onagraceae* of Madagascar and the Comoros, in Humbert, Not. Syst. **13,** 139–40 (1947), admits that the stamen numbers separating *Ludwigia* and *Jussiaea* are inconstant, and that the two genera are hardly distinct systematically, but hesitates, on the grounds of convenience, to take the plunge and amalgamate them.

To Messrs. J. E. Dandy and A. W. Exell of the British Museum (Natural History), with whom I have discussed this problem, my grateful thanks are due.

The following new combinations are necessary :—

Jussiaea jussiaeoides (*Desr.*) *Brenan*, comb. nov.

Ludwigia jussiaeoides Desr. in Lam., Encycl. Méth. **3,** 614 (1791).

Jussiaea perennis (*L.*) *Brenan*, comb. nov.

Ludwigia perennis L., Sp. Pl. 119 (1753).

Ludwigia parviflora Roxb., Fl. Ind. **1,** 440 (1820).

Jussiaea pulvinaris (*Gilg*) *Brenan*, comb. nov.

Ludwigia pulvinaris Gilg in Warb., Kunene–Sambezi Exped. 324 (1903) ; Trochain in Bull. Soc. Bot. France **82,** 144 (1935).

Jussiaea senegalensis (*DC.*) *Brenan*, comb. nov.

Prieurea senegalensis DC., Prod. **3,** 58 (1828).

Jussiaea ? prieurea Guill. et Perr. in Guill., Perr. et A. Rich., Fl. Seneg. Tent. 294 (1832–3).

Ludwigia prieurea (Guill. et Perr.) Trochain in Bull. Soc. Bot. France **82,** 142–3 (1935).

Ludwigia senegalensis (DC.) Trochain, Contrib. Étude Vég. Sénégal (Mém. Inst. Franç. Afr. Noire, **2**) 378 (1940).

As I have seen no material of *Ludwigia humbertii* Robyns et Lawalrée in Bull. Jard. Bot. Brux. **18,** 291 (1947) from the Belgian Congo, I prefer not to make a new combination based on it.

Jussiaea stenorraphe *Brenan*, sp. nov. ; ut videtur *J. suffruticosa* L. proxima, ab omnibus eae formis seminibus longioribus rapha quam corpus seminis multo angustiori facile distinguenda ; saepe etiam habitu elato fruticoso, sepalis petalisque plerumque majoribus et (in varietatibus grandifloris) stylo longiore distat.

Species polymorpha. *Fruticosa* vel nonnunquam herbacea, erecta, valde ramosa, 1–3 m. alta, ubique plus minusve dense patentim pilosa, rarius sparse pilosa vel tantum pubescens. *Folia* sublinearia usque elliptica, 2–10 cm. longa, 0·2–3·8 cm. lata, apice acuta vel subacuta, basi attenuata, nervis lateralibus foliorum majorum utrinque circiter 10–20 tenuibus arcuatis subtus prominulis ; petiolus plerumque 0–4 mm. longus. *Flores* staminibus exceptis tetrameri. *Sepala* triangulari-lanceolata, acuta, 6–13 mm. longa, 1·5–5 mm. lata, post anthesin saepe intus rubra. *Petala* lutea, obovata vel suborbicularia, 6–16 mm. longa, 4–16 mm. lata, apice late rotundata. *Stamina* 8, quorum quatuor quam alia longiora, filamentis 2–5 mm. longis, antheris 0·75–2 mm. longis. *Apex ovarii* stylum 2–6 mm. longum suffulciens applanatus vel leviter elevatus, usque ad 2 mm. altus. *Capsula* pericarpio tenui, puberula usque hirsuta, 1–4 cm. longa, 1·5–4 mm. lata ; pedicelli 1–10 (–20) mm. longi. *Semina* in utroque loculo pluriseriata, libera, oblongo-ellipsoidea, 0·75–0·8 mm. longa, 0·4 mm. lata, rapha angusta lineam elevatam secundum unum latus seminis simulans.

var. **stenorraphe**

Planta plus minusve dense patentim pilosa. Folia plerumque linearia usque lineari-lanceolata, eis flores subtendentibus inclusis. Sepala 6–9 (–10) mm. longa. Petala 9·5–13 mm. longa, 6–12 mm. lata, obovata. Apex ovarii applanatus vel usque ad 1·5 mm. altus. Stylus 2–4 (–6) mm. longus. Capsulae circiter 2–3 cm. longae, pedicelli 3–10 mm. longi.

French Guinea : Kouroussa, Dec. 1900, *Pobéguin* 601 :—marshy ground ; flowers yellow.

French Sudan. Nafadié, 18 Jan. 1899, *Chevalier* 159.

[Gold Coast. North Western District : Birrifwa, 23 Feb. 1927, *Sir A. E. Kitson s.n.* (BM) :—large shrub. Specimen poor and determination doubtful].

British Togoland. Kpedsu, 11 Dec. 1925, *Howes* 1043 :—shrub to 2·4m. high, occasional ; flowers bright yellow.

Nigeria. Oyo Province : Eruwa, 1893, *Dr. Rowland s.n.* Zaria Province : Anara Forest Reserve, Kangimi, 19 Mar. 1948, *Olorunfemi* FHI. 24424 :—open savannah woodland ; shrub 2·4–2·7 m. high. Zaria, *Kennedy* 2868 ; Sabon Gari near Zaria, 15 Dec. 1949, *Meikle* 834 :—in and by margin of stream about 0·8 km. from abattoir ; erect branching shrub to 3 m. ; twigs grey-brown ; leaves bright green, sometimes stained purple ; stems purple ; flower bright golden-yellow ; fruits purple. 27·2 km. N. of Kaduna, W.A.I.T.R. erosion experiment, 17 Nov. 1950, *Keay* FHI. 28113 (typus var. et spec. in Herb. Kew.) :—in moist part of cleared stream-bed ; erect herb to 1 m. high ; ovary pink ; sepals pale green ; petals 4, bright yellow. Plateau Province : Naraguta and Jos, 13 Sept. 1921, *Lely* 574 :—a herb about 1·5 m. high with yellow flowers 1·8 cm. in diameter ; on streambanks. Bauchi Plateau, Oct. 1930, *Lely* P 846 :—in marshes ; a perennial 0·9–1·8 m. high ; leaves linear-lanceolate ; flowers yellow. Kabba Province : Lokoja, 1858, *Barter* s.n. Lokoja, *Parsons* s.n. Adamawa Province : Yola, 4 Oct. 1909, *Shaw* 96 :—small tree or shrub ; yellow flowers. Locality doubtful : " Interior, Western Lagos ", 1893, *Dr. Roewland s.n.* Without locality, *Thornewill* 22.

Belgian Congo. Katanga : Elisabethville, May 1914, *Rogers* 10867.

Anglo-Egyptian Sudan. Equatoria Province : Ghattas's chief seriba, Oct. 1869, *Schweinfurth* 2500, *Schweinfurth, ser.* 3, 92. Mongalla, Chief Wai Wai, 31 Dec. 1935, *P. J. Sandison* 29 :—shrub 1·8 m. high ; yellow flowers. Ch. Bangazegino, 11 Dec. 1937, *J. W. G. Wyld* 360 (BM) :—shrubby bush in marshland : vernacular name " danda ".

Uganda. Northern Province, West Nile District : Madi, Dec. 1862, *Speke & Grant s.n.* :—in marshy ground ; 1·2 m. high. Eastern Province, Teso District : Serere, alt. 1100 m., Aug. 1932, *Chandler* 841 :—in swampy areas, dry Dec.–Mar. ; height 1–1·2 m. ; flowers moderately deep yellow. Buganda Province, Masaka District : Buddu, Kyebe, alt. 1220 m., Aug. 1945, *Purseglove* 1779 (K, EA) :—in partially inundated plains ; herb to 1 m. ; flowers yellow. Mubende District : Mubende, alt. 1370 m., 1913, *Snowden* 16 (K, BM) :—herb 1–1·2 m. high ; flowers yellow. Mengo District : Buvuma, Kibibi, *Maitland* 1149. Gayaza Road, mile 3, alt. 1220 m., Aug. 1931, *Herb. Botanist Dep. Agric. Uganda No. S.* 2205 (K, EA) :—in shallow swamp water ; flowers yellow. ? District : Mubango, alt. 1220 m., Dec. 1914, *Dümmer* 1398 (BM) :—near stream ; flowers yellow.

Tanganyika Territory. Mwanza District : N.W. Uzinza, Bugando Chiefdom, 18 June 1937, *Burtt* 6536 (K, BM) :—locally common in all river swamps ; tall herb 2·1 m. high; flowers primrose-yellow. Kigoma District? : Luiche R., between Kigoma and Machaso, alt. c. 840 m., 18 Feb. 1926, *Peter* 37018.

Northern Rhodesia. Mwinilunga District : near R. Lwamukunyi, 22 Aug. 1930, *Milne-Redhead* 966 :—among tall grass by stream in open ; strong growing herb 2 m. high ; flowers yellow.

Angola. Cuanza Norte District : Pungo Andongo, R. Cuanza near Candumba, Jan. 1857, *Welwitsch* 4469 (BM) :—in marshes ; erect herb 1·5 m. high, spreading-branched ; flowers yellow.

This, the typical and most widespread variety, is especially character-

ised by the combination of many spreading hairs and comparatively short sepals. It is the only variant of the species found in West Africa, where however it is widely spread ; in East Africa it appears to be absent anywhere east of Lake Victoria.

var. **reducta** *Brenan*, var. nov.

Planta puberula vel breviter pubescens, necnon pilis paucis patentibus breviusculis usque ad 1 mm. longis juventute praedita. Folia saepius parva, eis flores subtendentibus lanceolatis usque ad circiter 3 cm. longis, 0·8 cm. latis. Sepala 4–8 mm. longa, 1·5–2·5 mm. lata. Petala 6–10 mm. longa, 4–8 mm. lata. Apex ovarii circiter 0·7–1·5 mm. altus. Stylus 2–3 mm. longus. Capsulae exiles, 1–1·5 cm. longae, 1·5–2 mm. latae, seminibus fere abortis ; pedicelli 1–3 mm. longi.

Uganda. Buganda Province, Masaka District : Luwera–Masaka road, alt. 1220 m., Oct. 1931, *Hansford in Snowden Herb. No.* 2356 (typus var. in Herb. Kew., EA) : —low-lying grassland ; herb 0·7 m. high, erect ; flowers 4-merous ; corolla bright yellow. Mengo District : Namanyonyi, alt. 1220 m., Jan.–Feb. 1916, *Dümmer* 2738, 2738 A (BM) :—grassy swamplands ; 1·5 m. high ; flowers yellow. ?District & Province : Unyoro to Ankole, 1907, *Miss H. M. Tufnell s.n.* (BM). [The two following specimens from Mengo District are probably var. *reducta*, but collected in a young state : Entebbe, Nambegeruwa, alt. 1170 m., Dec. 1922, *Maitland* 537 :—side of road through swamp. Kampala, King's Lake, alt. 1190 m., 5 Dec. 1935, *Hancock-Chandler* 113 : —swampy area on outskirt of lake ; height 0·6–0·9 m. ; flowers yellow].

Tanganyika. Lake Province : without precise locality, *Conrads* 615.

The var. *reducta*, characterised especially by the few and inconspicuous spreading hairs combined with short sepals, is evidently more closely related to var. *stenorraphe* than to the other two varieties following. The poorly formed fruits seem characteristic and are present on *Hansford in Snowden Herb. No.* 2356, *Dümmer* 2738 and *Conrads* 615, the last-cited gathering being a very copious one.

Var. *reducta* is a rather puzzling plant. At present it is probably better to treat it merely as a local variant endemic to the region of Lake Victoria, but botanists are urged to observe and collect more of it in the field so that its status may be put beyond doubt. I feel that the possibility of its being a hybrid should be kept in mind.

Ward 4g, Tanganyika Territory, Southern Highlands Province, Iringa District, Idodi, Sept.–Oct. 1936, is very reminiscent of var. *reducta* but has larger foliage. More material from that locality would be most welcome.

var. **macrosepala** *Brenan*, var. nov.

Planta, juventute praesertim, pilis patentibus 1·5–2 mm. longis dense vestita. Folia, saltem caulina, utrinque longipilosa, sed pilis brevibus nullis ; folia flores subtendentia plerumque lanceolata. Sepala plerumque 10–14 mm. longa, 10–15 mm. lata. Apex ovarii applanatus vel usque ad circiter 1·5 mm. altus. Stylus 3·5–5 mm. longus. Capsulae 2–4 cm. longae ; pedicelli 5–20 mm. longi.

[Anglo-Egyptian Sudan. Equatoria Province : Yei, on road to Baraba's, *Sillitoe* 426 :—tall herbaceous plant 1·5 m. high, bushy, with yellow flowers, rare. Probably var. *macrosepala* but uncertain, as specimen is poor.]

Uganda. Northern Province, West Nile District : Terego, Aug. 1938, *Hazel* 665 : (typus varietatis in Herb. Kew.) :—near swamp ; flowers yellow ; 1·2 m. high.

Kenya. Central Province, Kiambu District : Theta Papyrus swamp, alt. 1370 m., *Battiscombe* 1122 (K, EA) :—herb. Nyanza Province, North Kavirondo District : Nandi to Mumias, 1898, *Whyte s.n.*

Tanganyika Territory. Tanga Province, Pare District : Butu, alt. about 700 m., Oct. 1927, *Haarer* 836 (K, EA) :—plant 75 cm. high. Gonja Swamp, alt. 610 m., Oct. 1935, *R. M. Davies* 1108 (K, EA) :—herb 1·2–1·5 m. high. Lushoto District : E. Usambaras, Kwagunda in the Luengera valley, 12 Dec. 1916, *Peter* K 669 (excursion 0.IV.128) :—by a stream ; 1·5 m. high ; flowers bright yellow. Makuyuni, *Koritschoner* 944 (EA). Western Province, Kigoma District : Kalia, Usowa, Oct. 1927, *C. H. B. Grant s.n.* (BM). Lake Rukwa, Aug. 1936, *A. Lea* 5791.

Nyasaland. North Nyasa District : Nyika Plateau, Mwanemba, alt. 2440 m., Feb.–Mar. 1903, *McClounie* 127.

[Territory ? " Victoria Nyanza region " : Mitiana, alt. 1220 m., 23 Dec. 1923, *Misses E. & C. Godman* 48 (BM). Determination doubtful.]

The var. *macrosepala* is usually easily separable from vars. *stenorraphe* and *reducta* by the longer sepals. In addition there is a characterstic tendency to broader leaves than in var. *stenorraphe* ; and the indumentum of var. *macrosepala* is much denser than in var. *reducta*. In var. *macrosepala* also the petals are commonly larger and the style usually longer than in var. *stenorraphe*. For the differences between var. *macrosepala* and var. *speciosa*, see under the latter variety.

Generally, var. *macrosepala* is a distinct and rather uniform plant, confined to the eastern side of tropical Africa.

var. **speciosa** *Brenan*, var. nov.

Indumentum ut in var. *macrosepala* facie simile, sed folia saltem caulina pilis longiusculis praesertim in costa villosa sed etiam pilis appressis multo brevioribus plus minusve numerosis praedita. Folia flores subtendentia elliptica vel elliptico-lanceolata. Sepala plerumque 9–13 mm. longa et usque ad 4·5 mm. lata. Petala suborbicularia, circiter 16 mm. longa et 15–16 mm. lata. Apex ovarii 1·25–2 mm. altus. Stylus 5–6 mm. longus. Capsula circiter 2·5 cm. longa ; pedicelli circiter 9–12 mm. longi.

Tanganyika Territory. Eastern Province, Rufiji District : Rufiji, alt. 10 m., 3 Jan. 1931, *Musk* 108 (K, EA) :—common in sandy riverbeds in semi-shade ; herb 0·9–1·5 m. high ; flowers yellow.

Portuguese East Africa. Lugela District : Namagoa estate, 19 Mar. 1949, *Mrs. Faulkner, Kew No.* 401 (typus var. in Herb. Kew., EA) :—common in some swampy areas ; large, spreading, half-climbing plants ; very handsome, brilliant golden-yellow flowers. Namagoa estate, Oct.

1944, *Mrs. Faulkner* 27 :—strong spreading plants growing in damp ground by a stream.

The var. *speciosa* is obviously more closely related to var. *macrosepala* than to the other varieties, but differs in the characteristically mixed indumentum on the leaves, which tend to be even broader, and also in the yet larger sepals.

Its apparent restriction to comparatively low altitudes near the coast is notable, but more observation is necessary as so little is known yet of its behaviour.

The species *J. stenorraphe* has been in the past much confused with *J. pilosa* H.B.K. (=*J. leptocarpa* Nutt.) and also with *J. villosa* Lam. (=*J. suffruticosa* L.). In many ways it is close to *J. suffruticosa*, but differs from all forms of that species in the narrow-raphed and usually longer seeds. In addition the more robust and not infrequently shrubby habit of *J. stenorraphe*, the commonly rather large sepals and petals, and the often longer style will separate it from one or another of the forms of *J. suffruticosa*.

The sepals of *J. stenorraphe* often turn bright red inside after the petals have fallen.

Jussiaea suffruticosa *L.* var. **brevisepala** *Brenan*, var. nov.

Plerumque herbacea, plus minusve patentim pilosa, nonnunquam dense, in caulibus et foliis, vel nonnunquam partibus juvenilibus tantum pilosis. Folia plerumque lanceolata vel lineari-lanceolata, eis flores subtendentibus 2–10 mm. latis, apicem versus gradatim angustatis haud parallelis. Sepala 3·5–6 mm. longa, 1·5–3·25 mm. lata. Petala 5–8 mm. longa, 3–4·5 mm. lata.

As the specimens of this variant are so very numerous—in most parts of Africa it is far the commonest representative of *J. suffruticosa*—I have contented myself with merely a selection of those I have seen.

Sierra Leone. Pendembu, alt. 90 m., 3 July 1914, *N. W. Thomas* 709. Yonibana, 30 Oct. 1914, *N. W. Thomas* 4059. Baoma, 16 Apr. 1936, *Deighton* 3167 :—river bank.

Liberia. Bushrod Island, 9 Dec. 1951, *Barker* 1101 :—in swampy ground ; herb 1 m. ; flowers yellow.

Gold Coast. Kumasi, Cadbury Hall, 2 Dec., *Darko* 481 :—herb about 60 cm. high ; leaves small and narrow ; flowers yellow.

Nigeria. Oyo Province : Ibadan fuel plantation, 14 Mar. 1950, *Keay* FHI. 25693 :—marshy ground at edge of reservoir ; perennial herb with almost prostrate radiating branches. Birnin Gwari Division : river at Birnin Gwari, 5 Apr. 1950, *Meikle* 1381 :—damp sandy river-bank ; procumbent herb with brown woody base ; stem and leaves pale green ; flowers greenish-yellow.

British Cameroons. Cameroon R., Jan. 1863, *Mann* 2227 (typus varietatis, K). Victoria, June 1927, *Maitland* 55 :—common about ditches and on edge of swamps. Bamenda, Wuru, alt. 1070 m., Apr. 1931, *Maitland* 1593 :—on edge of water by road-side.

French Cameroons. Bipinde, 1899, *Zenker* 2036 (K, BM). Bipinde, 1913, *Zenker* 4692 (K, BM).

S. Tome. Jan. 1886, *Quintas* 1021 (K, BM).

Belgian Congo. Lutété, R. Ntombi, 20 Feb. 1888, *Hens, Ser. A*, 240 :—marshy ground ; flowers yellow. Near Malela, 31 Dec. 1918, *Vermoesen* 1276.

Anglo-Egyptian Sudan. Bahr el Ghazal Province : Yubo, by R. Yubo just below source, alt. c. 700–750 m., 19 Mar. 1934, *Dandy* 693 (BM) :—aquatic herb in irrigation-channels ; flowers yellow.

Uganda. West Nile District : Maracha, Dec. 1939, *Hazel* 400 :—by small stream ; 30–60 cm. high ; flowers orange-yellow.

Kenya. Teita District : Voi, alt. 580 m., 9 May 1931, *Napier* 999 (K, EA) :—river bank ; stems red ; flowers yellow.

Tanganyika. Shinyanga District : Shinyanga, *Koritschoner* 3005 (K, EA) Lushoto District : Mashewa, July 1893, *Holst* 8787. Lat. 7½° S, Oct. 1860, *Speke & Grant s.n.*

Zanzibar. Damp places, July–Nov. 1873, *Hildebrandt* 972 :—flowers yellow. Zanzibar, *Mrs. Taylor* 80 (K, EA) :—small marsh plant. Zanzibar, 1931, *Vaughan* 1427 (K, EA).

Pemba. Chake Chake, 20 Oct. 1929, *Vaughan* 837 (EA) :—herb 60 cm., hairy ; flowers yellow.

Nyasaland. Kota-Kota District : Benga, W. shore of Lake Nyasa, alt. 470 m., 2 Sept. 1946, *Brass* 17485 :—occasional on sandy beaches ; herb ; branches prostrate and spreading radially ; flowers yellow. Chikwawa District : Lower Mwanza River, alt. 180 m., 6 Oct. 1946, *Brass* 18014 :—uncommon on sandy river-beaches ; 60–70 cm. high ; flowers yellow.

Southern Rhodesia. Wankie, Deka R., 21 June 1934, *Eyles* 8063 (K, BM) :—on river bank ; flowers yellow.

Northern Rhodesia. Livingstone, alt. 910 m., 1909, *F. A. Rogers* 7060 :—on sand. Mwinilunga District : Kalenda Dambo, 10 Dec. 1937, *Milne-Redhead* 3594 :—by side of streamlet in open ; perennial ; shoots procumbent, radiating from a woody rootstock ; leaves bright green with paler veins ; stems and calyx reddish ; petals 4, very fugacious, heart-shaped, yellow ; stamens 8.

Angola. Golungo Alto, Apr. 1856, *Welwitsch* 4462 (K, BM) :—in marshes ; herb to 1·2 m. high ; flowers yellow. Pungo Andongo, Feb. 1857, *Welwitsch* 4472 (K, BM) :—prostrate herb ; flowers yellow. On the Onschingue (Kuilo), alt. 1200 m., 1 Apr. 1900 *Baum* 790.

This variant, distinguished by the short sepals and (from the following variety) by the relatively broader leaves, does not seem to grow outside Africa.

Jussiaea suffruticosa *L.* var. **piloso-linearis** *Brenan*, var. nov. ; caules et folia pilis longis patentibus plus minusve dense vestita ; folia linearia, eis flores subtendentibus 1–2 (–3) mm. latis marginibus plus minusve parallelis ; sepala 3–5 mm. longa, 1–2 mm. lata.

Togo. *Baumann* 246 (typus varietatis, K).

Nigeria. Abeokuta, *Dr. Irving* 71. Owo District : Dry season gravel banks of R. Ogbesse below confluence of Awenwen stream near Akinjare, 2 Apr. 1943, *A. P. D. Jones* FHI 3110 (FHI) :—annual herb 30 cm. high.

Belgian Congo. Bukama, 24 Feb. 1926, *Robyns* 1497.

Kenya. Northern Province : Dandu, alt. 885 m., 20 Mar. 1952, *Gillett* 12603 :—by recently dried pool in torrent-bed ; 1 m. high ; corolla dull yellow. Central Province, district doubtful : River Athi, 20 miles beyond Thika, alt. 1280 m., 1 May 1939, *Bally in CM.*,9202 (K, EA) :—decumbent herb on rocky soil near river-edge.

Tanganyika: Pare District : Kisiwani, alt. 650 m., 14 July 1915, *Peter* K.662 (0.III 144) :—in a swamp.

Jussiaea gracilis *Brenan*, sp. nov. ; affinitatis dubiae, seminibus in utroque capsulae loculo uniseriatis pendulis nec horizontalibus liberis nec endocarpio inclusis egregia ; praeterea sepalis elongatis sed angustis, staminibus 4, capsulis angustis elongatis insignis.

Herba ut videtur annua, usque ad 75 cm. alta, valde ramosa ramis inferioribus adscendentibus, partibus juvenilibus (caulibus foliis ovariis sepalis inclusis) puberula, pilis minus quam 0·2 mm. longis adscendentibus vel appressis. *Folia* plerumque anguste lanceolata usque oblongo-linearia, 3–7 cm. longa, 0·3–0·9 cm. lata, apice subacuta, basim versus longe attenuata et in petiolum 2–10 mm. longum transeuntia, nervis lateralibus utroque costae latere circiter 10–12 inconspicuis adscendentibus ; folia infima minora elliptica. *Flores* ex axillis superioribus singuli orti, staminibus inclusis tetrameri. *Sepala* anguste lanceolata, acuta, 6–8 mm. longa, 1·2–1·5 mm. lata. *Petala* caduca, ex alabastro descripta et ibi elliptica 3·25 mm. longa 1·75 mm. lata basi apiceque rotundata, ideo forma matura ignota sed lectoris teste flores circiter 1·2 cm. diametro pallide lutea. *Stamina* filamentis 1·25 mm. longis, antheris 1·25 mm. longis 1 mm. latis. *Apex ovarii* stylum 2–2·5 mm. longum suffulciens leviter conicus, circiter 0·5–0·75 mm. altus. *Capsula* pericarpio tenui, sparse puberula, transverse plus minusve tetragona, circiter 4–4·5 cm. longa et 1·5 mm. lata ; pedicelli circiter 8–14 mm. longi. *Semina* in utroque loculo uniseriata, libera, i.e. endocarpio non inclusa, oblongo-ellipsoidea, pallide brunnea, circiter 0·9 mm. longa, 0·5 mm. lata, rapha angusta lineam elevatam incrassatam secundum unum latus seminis simulans.

British Togoland. Kpandu, 1924, *J. M. Robertson* 66 (typus, BM) :—growing in damp places ; from " a few inches " to about 75 cm. high ; flowers small, about 1·2 cm. in diameter ; petals pale yellow, fugitive.

The fruits of this remarkable plant are alone enough to separate it. The only other African species with seeds uniseriate in the loculus and pendulous is *J. repens* L. but there the seeds are not free but fused with the endocarp, and *J. repens* differs utterly in most other significant points. *J. prostrata* (Roxb.) Lév. (*Ludwigia prostrata* Roxb.) from Asia has free uniseriate seeds, which however are horizontal not vertical, and there are many other very obvious differences. *J. jussiaeoides* (Desr.) Brenan has a certain resemblance to our plant, but is far larger especially in the flowers, and has pluriseriate seeds.

Jussiaea (Sect. *Jussiaea*, i.e. *Eujussiaea* Munz) **africana** *Brenan* sp. nov. ; *J. abyssinica* (A. Rich.) Dandy et Brenan facie persimilis, indumento manifesto, foliis plerumque latioribus, sepalis longioribus, petalis majoribus, staminibus 8, pedicellis longioribus, seminibus majoribus differt ; a *J. linifolia* Vahl indumento longiore et densiore, seminibus in parte apicali capsulae haud pluriseriatis, pedicellis multo longioribus distat ; a *J. affini* DC., minus affini, indumento, sepalis 4, fructibus angustioribus, pedicellis multo longioribus facile distinguenda.

Habitus incertus, verisimiliter herbaceus, usque ad minimum 40 cm. altus. *Caulis* praesertim superne crebre ramosus, in statu sicco plus minusve angulatus, usque ad 3 mm. diametro, pilis minimis minus quam 0·2 mm. longis satis dense puberulus, quibus pili alii longiores usque ad 0·5 mm. longi plus minusve sparse adjecti ; indumentum foliorum (praesertim in costa nervisque lateralibus), petiolorum, pedicellorum, ovariorum, sepalorumque extra eo caulis simile. *Folia* tenuia, ovato-elliptica, 1·5–8 cm. longa, 0·8–3 cm. lata, apice acuta vel subacuminata, basi subrotundata vel late cuneata, costa nervisque lateralibus utroque latere costae circiter 14–20 arcuatis et sub marginem anastomosantibus subtus satis prominentibus ; petiolus 0·4–1·5 cm. longus. *Flores* in ramulis bracteatis saepius in paniculam amplam foliosam aggregatis instructi, staminibus exceptis tetrameri. *Sepala* ovata vel ovato-oblonga, acuta, 3–4·5 mm. longa, 1·5–2·5 mm. lata. *Petala* lutea, rotundata, circiter 5 mm. diametro. *Stamina* 8, paulum inaequalia, filamentis 1·75–2 mm. longis, antheris suborbicularibus 0·75–1 mm. diametro. *Apex ovarii* stylum circiter 2·5 mm. longum suffulciens applanatus vel usque ad 0·75 mm. elevatus. *Capsula* pericarpio tenui, puberula, 1–2·3 cm. longa, 1·5–2·5 mm. lata ; pedicelli manifesti, 3–8 mm. longi. *Semina* in utroque loculo uniseriata, ellipsoidea, brunnea, circiter 0·9–1 mm. longa, 0·6 mm. lata, rapha angusta lineam elevatam incrassatam secundum unum latus seminis simulans ; semen quodque segmento endocarpii trigono et transverse applanato circiter 1 mm. lato 0·5–0·7 mm. longo fere omnino coopertum sed in segmento ipso liberum.

Sierra Leone. Without exact locality, received 6 Aug. 1918, *K. G. Burbridge* 540.

French Cameroons. Edge of little stream near village, Efulen, 30 Oct. 1895, *G. L. Bates* 43a. Bipinde, rain-forest region, 1899, *Zenker* 2015 (K, BM). Same locality, 1903, *Zenker* 4696 (K, BM).

Spanish Guinea. Bebai, 23 Dec. 1908, *Tessmann* 755 (typus in Herb. Kew.) :—petals four, yellow, very caducous.

Jussiaea repens *L.* var. **diffusa** (*Forsk.*) *Brenan*, comb. nov.

Jussiaea diffusa Forsk., Fl. Aegypt.-Arab. 210 (1775).

Trapa natans *L.* var. **africana** *Brenan*, var. nov. ; fructus, i.e. endocarpium, omnino 4·5–6 cm. latum, quadricornutum, cornibus gracilibus rectis vel leviter curvatis 1·5–2 cm. longis 2–3 mm. prope basim latis apice acutis et paulum infra apicem reflexe barbatis, cornibus duobus deflexis duobus fere horizontalibus.

Uganda. Mengo District. Lake Victoria, Entebbe, alt. 1136 m., Nov. 1930, *Snowden* 1832 (typus varietatis, K, EA) :—water-plant,

floating, some parts submerged ; flowers white ; fruits with four long spines, floating. Same locality, Mar. 1932, *Tothill* 1565.

Tanganyika. Lake Province. Ukerewe, *Conrads* 5894 (K, EA).

Some other Uganda gatherings in the Kew Herbarium are probably this variant, but lack fruits.

Trapa natans L. var. *africana* " (Flerow) Gams " in Pflanzenareale **1,** map 25 (1927 is probably a synonym of our plant, but is a *nomen nudum* based on *T. africana* Flerow, which is also a *nomen nudum*.

The Grain Sorghums.

The importance of this extremely large group of tropical cereals as a source of food for man and beast is now widely recognised by agriculturists and others dealing with world food-shortages. Over large areas of Africa and tropical Asia, the grains of these plants form an important part of the diet of the natives, whilst elsewhere, especially in America and parts of Australia, they are used extensively as food for domestic animals. There are many thousands of local varieties, differing much in structure, yield and growth requirements. Their identification is difficult. It is not generally known, however, that a comprehensive survey of them was undertaken about twenty years ago, when as the result of an appeal issued in the British Commonwealth and in many other countries, several thousand flowering and fruiting heads, together with much valuable data concerning them, were received at Kew. This material was utilized in the preparation of the book entitled " The Cultivated Races of Sorghum", by J. D. Snowden, at one time Economic Botanist in the Uganda Protectorate. In its 274 pages, this book includes not only a classification and descriptive account of the 31 botanical races and of their numerous varieties and forms, but also detailed information on their distribution, culture and economics, together with an extensive bibliography of twelve pages, indices of botanical and vernacular names, and numerous illustrations. It is a work which should be in the libraries of all agricultural officers dealing with tropical field crops, and of everyone generally interested in economic botany. Copies, in paper covers, are still available from the Bentham-Moxon Trustees, Royal Botanic Gardens, Kew, Richmond, Surrey, at the very reasonable price of 10/6, postage extra.

ARTEMISIA NORVEGICA FRIES IN SCOTLAND.

R. A. Blakelock.

This species was found in August 1950 and again last August in Wester Ross, in the neighbourhood of Ullapool, Scotland, by Sir Christopher Cox, K.C.M.G. As it has not been recorded from Britain either as an alien or as a native plant, some account of the plant is given here.

Artemisia norvegica *Fries* ; Novit. Suec. ed. 1, 56 (1817).

Plant up to 7 cm. high. *Rootstock* perennial, short. *Stem* silky hairy. *Radical leaves* in rosettes (sterile rosettes present), ovate in outline palmate-pinnatisect, ascending and curved ; segments linear, acute, green, glabrescent above with white silky hairs below, up to about 2 cm. long. *Cauline leaves* 1–4, pinnatisect. *Capitula* nodding, up to 12 mm. diam., generally only one on each stem but sometimes with one or two small capitula just below the terminal one rarely with up to 4 small capitula lower down on stem ; involucral bracts with silky hairs towards base (especially the outer ones) or glabrous, green in centre, margin scarious dark brown, somewhat jagged, apex ± rounded. *Corollas* yellow with long hairs on the outside ; disc florets hermaphrodite ; ray florets with style but no stamens. *Receptacle* glabrous.

Norwegian plants may reach 32 cm. high and often have 3–10 capitula. Glabrous forms have been reported (19, 29) (var. *uralensis* Rupr. Verbreit. Pflanz. nordl. Ural 64 (1850)). The solitary or few large capitula with wide dark brown margins to the involucral bracts, low growth and tufted habit distinguish it at once from any other British species of *Artemisia*.

The species is figured by Lindman (26), Correvon (8) and Reichenbach (41).

The following information has been kindly supplied by the collector. The locality is a remote one and not easily accessible, being about $2\frac{2}{3}$ miles as the crow flies from what seems to be the nearest cottage, and about 105 minutes steady walking from a road. The species was growing on the spur of a mountain between 2,350 and 2,450 ft. (possibly as low as 2,250 ft. in one place). The spur forms an undulating plateau rather less than half-a-mile long and not much more than 100 yards wide at its narrowest but some 350 yards or more wide at its broadest point, " where the slight tiltfrom N.E. to S.W. which characterises the whole spur becomes much more pronounced and the plateau forms a kind of sideways-slipping basin above what seems to be a break in the line of crags below. More than half the colonies observed were in this basin ". Twenty-four colonies in all were counted, each say 5 to 10 yards square ; " within each colony examined the plant was growing fairly plentifully in up to half a dozen small areas, each such area containing one to (usually) several clumps or single plants or, more commonly, single plants and clumps together." The largest contiguous clump measured was 14 cm. by 4 6·5 cm. On the assumption that contiguous but apparently separate plants in small clumps were in fact separate, the collector considers that, on a very rough estimate, he saw between 500 and 1,000 plants and he has little doubt that, as it was only possible to examine

parts of the spur in the limited time available, a number of colonies exist in addition to those which he saw.

There was a marked lack of flowering stems—several colonies and many clumps had none. The type of flowering stem seen most often was small and seemingly shrunken or withered, giving the appearance of a withered bud. Of fully grown flowering stems the more usual type was the solitary head ; the double-headed specimens, though more than one was picked for the vasculum, were much rarer. " The most notable single cluster of flowering specimens comprised 4 contiguous plants, each with single-headed flowering stem, side by side, the heads all turning to the S.W., the whole forming a clump about 9 cm. wide, and about 20 cm. away two contiguous plants with double-headed flowering stems ".

Artemisia norvegica is thought to have been about the third commonest plant of the type of habitat where it occurred, the other two being *Alchemilla alpina* and *Antennaria dioica*, not taking into account the abundant small tufts of grass. *Gnaphalium supinum* was not infrequent in the vicinity.

A list of the associated plants is :—

Cherleria sedoides L.
Alchemilla alpina L.
Galium hercynicum Weigel (*G. saxatile* auct. non L.).
Succisa pratensis Moench
Gnaphalium supinum L.
Antennaria dioica (L.) Gaertn.
Solidago virgaurea L. var. *cambrica* Huds.
Vaccinium myrtillus L.
Thymus drucei Ronn. em. Jalas
Salix herbacea L.
Carex sp.
Deschampsia flexuosa (L.) Trin. (det. Mr. C. E. Hubbard)

also the following cryptogams (the mosses and the hepatic identified by Miss J. Taylor and the lichen by Mr. D. A. Reid).

Polytrichum juniperinum Hedw.
Dicranum scoparium Hedw.
Rhacomitrum lanuginosum (Hedw.) Brid.
Pleurozium schreberi (Brid.) Mitt.
Hypnum cupressiforme Hedw. var. *ericetorum* B. & S.
Anastrepta orcadensis (Hook.) Schiffn.
Cladonia rangiferina (L.) Hoff. (det. D. A. Reid)

It may be noted that none of the weeds of agriculture or horticulture are present. Nor is there any sign of the soil having been disturbed. The surface where the plants occur is a " clitter " of low flat boulders and stone with patches of bare gravel or gravelly soil in between (the patches occupying about as much space as the large stones), and occasionally outcrops of the living sandstone piled in characteristic layers. The habitat is exposed and normally dry.

The collector, referring to his " original unquestioning assumption on the spot that the plant was native " and explaining why he has remained of this opinion during and since his last visit when he had this specific

point in mind, gives as his principal reason " the relative abundance in which the plant occurs, in a number of colonies scattered over an area getting on for half-a-mile long by 100 350 yards wide where it is to all appearances as completely at home as its neighbours ", and adds that he will " be surprised if doubt as to its native status persists in the mind of anyone who has once seen it growing *in situ* ".

Rock samples were kindly examined by the Geological Survey and Museum, S. Kensington, who send the following report. The samples " are of felspathic grit from the Torridonian Sandstone formation. Petrographically they belong to the type of grit known as *arkose*, that is, a felspathic grit derived by the denudation of granite or gneiss with little intervening decomposition. The rock is thus composed essentially of felspar and quartz. The felspars are generally fresh potash-felspars, with subordinate sodic felspar, to some degree replaced by small flakes of white mica. The other main constituent is free quartz. The samples have not been sectioned and therefore subordinate constituents have not been identified, but as they are typical Torridonian arkose, the rock which they represent will contain small quantities of white mica, epidote and calcite with traces of chlorite, sphene and apatite. Iron oxide is present as the sparse brown cementing material and probably also in discrete small grains. Chemical analyses of some Torridonian sandstones are given by W. Mackie in Trans. Edin. Geol. Soc. **7**, 456 and **7**, 56 and J. J. H. Teall in the " Geology of Glenelg " Geological Survey Memoir explanatory of One-inch Sheet 71, p. 59.

A soil analysis has been supplied by the Macaulay Institute for Soil Research. The report reads as follows—" The amount of material available was much too small for any comprehensive examination to be carried out. The rock fragments in the sample are mainly sandstones with some quartzite and pieces of quartz. In the sand fraction, the minerals present are largely quartz, some felspar, and a few iron oxide grains. The soil is markedly acid (pH 4·8) and very low in calcium. It is also very low in phosphate. The potassium and magnesium contents are relatively much higher, being comparable with the values encountered in many agricultural soils. To summarize, the sample is very light textured, markedly acid and very low in lime and phosphate ; but for soils of this type it is relatively well supplied with potassium and magnesium."

Artemisia norvegica in Norway and the Urals.

Outside Britain, *Artemisia norvegica* sensu stricto is confined to the Dovrefjeld district and adjacent mountains in Norway and to the Northern Urals. From the former area it is well represented at Kew.

In Norway, from Nordhagen's account, it has three areas of distribution on adjacent mountains. These are (1) Gruvedal district, (2) Trollheimen, (3) the district Drivdalen–Knutshø—north Foldalsfjell. It is most vigorous in the Gruvedal district, where all the localities are grouped round the glacial lakes, and it may occur as low as 800–900 m. (2,660–3,000 ft.) in the subalpine region. Its abundance here is due to large areas of unstable ground caused by stream erosion and, also, Gruvedal was one of the first valleys in the Møre coast to become free from

ice without being at the same time covered by the sea (p. 341, 343). On Trollheimen it is confined to the alpine region. In the Drivdal it is mainly alpine but occurs also in the subalpine region but not so vigorously as in Gruvedal (29, p. 343). Hultén also gives a map (22).

Artemisia norvegica grows on dry gravelly places in the alpine zone and in the birch zone, sometimes descending into the zone of cultivation(33). It occurs in relatively close plant communities, as well as on bare gravel. It is found in *Elyna*—grass heaths which have no continuous humus-cover and have much bare soil due to wind erosion. The plants' vitality is never as great as in loose gravel. Our species is similar in its ecology to *Artemisia laxa* and *A. glacialis* of the Swiss Alps. It is very resistant to wind exposure and can stand being bare in winter when most plants are covered with snow. In both Gruvedal and Trollheimen it grows on the tops of the moraine ridges, on wind-exposed schists and where the vegetation is open ; on some peaks it is one of the most resistant of mountain plants. A list of associated plants includes *Alchemilla alpina*, *Antennaria dioica* and *Salix herbacea* (29, pp. 329, 337).



Fig. 1. Map showing distribution of *Artemisia norvegica*.

According to Fries *A. norvegica* is calcicole, but in Trollheimen it seems to be the least calcicolous of all the " Dryasflora ", occurring on hard gneiss together with common mountain species [i.e. species which do not need much lime]. It is " kalkhold ", that is favourably influenced by lime but not confined to calcareous soils (29). In sheltered places it is a vigorous plant forming big tufts with stems growing up to 25, sometimes 30 cm. high and with many heads. In windy places it is dwarfed and sometimes only a few centimetres high with a few heads (sometimes only one head). There is a coincidence between its area and the distribution of certain late glacial gravel deposits originating from ice-dammed lakes (29). It is also often found in rock fissures, small terraces and rock ledges, where the root is very short and thick the upper part being above the soil and woody (26). Haglund states that it often occurs in

places which are flooded in spring by a stream (15, p. 271). It is protected by a law passed by the Norwegian Government in 1911 along with other alpine plants of the Dovrefjeld (26). A list of these plants is given by Wille (49). In this connection I am much indebted to Dr. O. Hedberg for translating from the Scandinavian literature, as well as to Prof. R. Nordhagen, Oslo University, who has kindly supplied much valuable information and made available to me literature which I should otherwise have missed.

Haglund suspected that propagation of our plant in Norway may be vegetative only as the heads were usually dry and the seeds shrivelled, but this opinion was based on one year's observation only (15, p. 264). Nordhagen, moreover, has been unable to find ripe seed and, despite diligent investigation, has only once found seedlings. It flowers in August and September (29, p. 347). Although not given by Chittenden (7) or Bailey (3) as a cultivated plant, there is a record of its having flowered in the Botanical Garden at Upsala (13). Correvon (8) gives the following note, which presumably refers to its cultivation in France : " A plant for rockeries or borders, easy to keep, on condition that the foliage is kept as dry as possible. Multiplication by seeds, cuttings or division."

Straka (48) gives some account of its pollen. According to the Swedish cytologist A. Nygreen *Artemisia norvegica* has the chromosome number 2n=18 (Nordhagen in litt.).

In the northern Urals *Artemisia norvegica* is found at the sources of the Sygwa R., a tributary to the Soswa River, about 65° N. and between 60° and 62° E. (20, p. 1561). It is also recorded from Deneshkin, Mt. Konshakowskij ; Töll-Poss ; Ssabljo and Pai Jer (29, p. 351). It is not clear whether *Artemisia norvegica* is generally distributed along the Urals or confined to a few peaks only. I have not seen any specimens from this district, but Nordhagen has examined a good deal of material from the Urals and was unable to split the European population into two species (29).

As long ago as 1893 the Norwegian botanist Axel Blytt wrote about the possibility that certain alpine Scandinavian plants with a very disjunct distribution could have survived the last Ice-Age in Norway on ice-free nunataks. This theory of the survival of an arctic-alpine floral element on a (presumably) ice-free strip along the Atlantic shore of Norway (in the case of our species on the coast of Møre) has found considerable support among Scandinavian botanists and geologists (29). Nannfeldt treats of this theory at some length, concluding that " it is established beyond doubt that numerous species survived the last glaciation within Scandinavia in ice-free " sanctuaries " in the West and North in immediate proximity of the mountain range, and as almost all of these species, the distributions of which cannot be explained in any other way, are rare and localized and have very little capacity of dispersal, or very special requirements as to their habitats, is it not necessary then that more common species with greater power of dispersal and competition, and with fewer requirements as to habitat have been still more capable of surviving? Or is there any reason to believe that the refuges were a kind of botanical gardens containing rare plants only " (37, p. 83).

The opposite theory, that species with this type of distribution, were driven south in Europe during the Ice Age and re-migrated to N. Europe post-glacially, is apparently ruled out by their absence in the mountains of Central Europe.

Related Species.

Closely related species or possibly subspecies of *A. norvegica*, are found from N.W. America to Siberia but not in Novaya Zemlya (27), although *A. arctica* Less reaches the Kola Peninsula (29, p. 351). These form a critical circumpolar group (with a southwards extension into the Rocky Mts. and the Sierra Nevada of California), in which authorities do not agree on the limits of species, subspecies and varieties. The list given below is taken mainly from Hultén (19, 20, 21), Hall and Clements (16), Koidzumi (24) and Takeda (49) ; the other works given in the bibliography have also been consulted, but the list must not be regarded as critical.

N. Russia (Kola Peninsula)	*A. arctica* Less.
Siberia	*A. arctica* Less. *A. glomerata* Ledeb. *A. heterophylla* Bess. *A. trifurcata* Steph.
Kamschatka and the adjacent islands	*A. arctica* Less. *A. globularia* Chamisso *A. glomerata* Ledeb. *A. trifurcata* Steph.
Japan	*A. arctica* Less (Yeso, the Kuriles, Sachalin) *A. glomerata* Ledeb. (Yeso)
Alaska and the Yukon	*A. arctica* Less *A. alaskana* Rydb. *A. comata* Rydb. (*A. arctica* subsp. *comata* (Rydb.) Hultén) *A. globularia* Chamisso *A. glomerata* Ledeb *A. trifurcata* Steph.
N. America (given as subspecies of *A. norvegica* by Hall and Clements)	*A. globularia* Chamisso *A. glomerata* Ledeb. *A. heterophylla* Bess. *A. saxatilis* Bess.
(given as " minor variations and synonyms " by Hall and Clements)	*A. arctica* Less. *A. comata* Rydb. *A. chamissoniana saxatilis* Bess. *A. cooleyae* Rydb. *A. hyperborea* Rydb.

A. levigata Standley
A. minuta Rydb.
A. norvegica pacifica Gray
A. richardsoniana Bess.
A. saxicola Rydb.
A. taconemensis Rydb.
A. tyrrelli Rydb.

The differences between the European *A. norvegica* Fries and its nearest ally *A. arctica* Less. are clearly set out and illustrated by Hultén (19, pp. 178–9, fig. 4).

The most constant of his characters seem to be :—

A. arctica is a taller plant usually 30–60 cm. high, although in exposed places it may be more low-grown. The radical leaves are long-petioled, pinnate (never palmatifid), usually with 3–4 pairs of pinnae. The ultimate segments of the leaves are linear and long acuminate. Leaves and stem are floccose when young, but become glabrous in time, except for the upper part of the stem and the peduncles.

A. norvegica is usually more low grown 2·5 32 cm. high. The radical leaves have shorter petioles, more or less clearly palmatifid usually with five principal lobes which are irregularly lobed and linear. The ultimate segments of the leaves are linear, and more abruptly pointed. Leaves and stem covered (often comparatively densely) with hairs (glabrous forms are exceptional 19, 29). The capitula are generally somewhat larger.

Hultén (18) places *Artemisia arctica* (including *norvegica*, *saxatilis* and *heterophylla*) among " Arctic-montane plants and their reductions " (p. 87). He regards (p. 94) this group as containing " these plants which before the maximum glaciation had reached south of the ice in western America, and which during the E.-interglacial and possibly also during the last glaciation more or less filled up the gap formed in their area in the mountains of western America. If they ever possessed an arctic American branch, it must have been completely destroyed by the maximum ice. The small number of plants belonging to this group seems to indicate that this was really the case and that they are only reduced types of the following group [i.e. Circumpolar, arctic-montane plants not reaching as far south in E. America as to the refugia around the Gulf of St. Lawrence. pl. 29]. These plants [i.e. Arctic-montane not occurring in Eastern America at all. p. 28] are :

Not reaching Yenisei [in Siberia] on the arctic branch nor Europe on the montane :

Saxifraga serpyllifolia (incl. var. *viscosa*)
Artemisia trifurcata
Potentilla uniflora

Reaching Yenisei, but not Scandinavia on the arctic branch nor Europe on the montane :

Saxifraga bronchialis sens. lat.
Saxifraga punctata sens. lat.

As before but also reaching Scandinavia :

Artemisia arctica (incl. *norvegica*, *saxatilis* and *heterophylla*)

As before but also reaching Central Europe :

Myosotis alpestris (sens. lat.)"

It may be noted here that only one species of *Artemisia* (*A. borealis* Pall.) is recorded from the Canadian Eastern Arctic (36, p. 362) ; a species which, although showing some resemblance to *A. norvegica* and its immediate allies, is placed in Sect. *Dracunculus* (disk-flowers sterile, ovary abortive, receptacle glabrous) and not with *A. norvegica* in Sect. *Abrotanum* (disk-flowers fertile ovary normal, receptacle not hairy) by Hall and Clements (pp. 46–47). *A. borealis* is widely distributed in Arctic America and Siberia, including Altai, Kamschatka and Novaya Zemlya.

A native Species in Scotland?

It remains to be considered whether *Artemisia norvegica* is a native of Scotland or not. The locality is not one often visited by botanists, and is about as little disturbed by human influence as anywhere in Britain. Altitude, habitat and the associated plants suggest that it may be native. The fact that it is locally abundant over a small area and not a solitary specimen only also favours this view. The distribution of the species and its allies outside Britain make it possible that it is an outlying relict of this once more widespread group. *Diapensia lapponica* L., *Artemisia norvegica* Fries and *Koenigia islandica* L., as well as other species with, in Matthew's terminology, an arctic-subarctic (i.e. entirely northern) rather than an arctic-alpine distribution (i.e. in the mountains of Central and Southern Europe as well as in the north), *might* have survived the Ice Age on some ice-free area either on the coast or inland, as similar plants are said to have done in Norway. By the way all three species occur in the Dovrefjeld. These plants are assumed to have migrated to or survived in their present localities after the retreat of the ice sheets. There is some evidence that some of the outlying islands of Scotland escaped glaciation (51, p. 441 ; 52, p. 850) ; also there are a number of species whose local distribution in Scotland and in the north and west of England and in Wales suggest that they survived the Ice Age in or very near the areas they now occupy (50, p. 153 ; 56, pp. 215–222). But it must be pointed out that this distribution may be due to ecological rather than prehistorical causes. There was a discussion of the problems involved at the Royal Society in 1935, which shows how various are the opinions among geologists and botanists (56). Good (14) and Turrill (53) give recent summaries of the prehistory of the British flora and bibliographies.

The possibility of such alpine or arctic-subarctic plants having been planted or otherwise introduced must also be considered. That such introductions have been made in some Scottish localities is shown by the following examples. The " reputed discoveries " of George Don (1764–1814) in the Clova Mts. are not quite relevant as at least some of his records are thought to have arisen from confusion with Continental species grown in Don's garden (9). One of Don's plants, *Homogyne alpina* (L.) Cass., has recently been refound (42). The curious instance of *Sagina boydii* Buch.—White which has not been refound as a wild plant since its first discovery in 1878 by Boyd, shows a similar obscurity, as Boyd had living plants from Switzerland as well as from Braemar in his potting shed at the time *S. boydii* was first detected (9). As long ago as 1885 an

anonymous friend of Buchanan-White's sowed seeds of *Myosotis alpestris*, *Erinus alpinus*, *Primula auricula* and other aliens in Canlochan [Caenlochan], Forfarshire [Angus], as well as the seeds of various plants obtained from cultivated Ben Lawers plants. He also sowed the seeds of various alpines on Ben Lawers. Most of the plants were those conspicuous for their showy flowers (4). Skalińska (47) in 1940 made a careful cytological examination of " *Aquilegia alpina* L." from Caenlochan, deciding that the species was *Aquilegia pyrenaica* DC and not a native. The locality suggests that the specimens might be descended from those sown by Buchanan-White's friend. Raven (40) describes a plant of *Polycarpon tetraphyllum* (L.) L. from the Isle of Rhum which differs in its morphology (much branched inflorescence and acuminate sepals) from material from southern England. The plant was also growing very near an alien species of *Wahlenbergia*. *Carex bicolor* All. grew in suspiciously close association with *Poa annua* ; he suggests that both these species are introductions. It is noteworthy with respect to this last that the details of the introduction are unknown and it is only from indirect evidence that the plants are considered alien.

Other obvious aliens from Rhum are *Carex brunnea* R. Br. var. *minor* Brott. a native of the Mascarene Islands, and the Mediterranean *Poa bulbosa* L. var. *vivipara* Koel. (det. Mr. E. Nelmes and Mr. C. E. Hubbard). The Kew Bulletin (p. 319–320, 1921) has the following note " For some considerable time Mr. A. K. Bulley, of Ness, Neston near Birkenhead, has been anxious that the experimental planting of Alpine plants from all parts of the world might be attempted in England or Wales where the conditions approach those in which such plants naturally grow. The experiment is desirable as a concomitant of the corresponding attempt arranged for in the Highlands of Scotland by the Regius Keeper of the Royal Botanic Garden, Edinburgh". A certain number of alpine species were planted on Snowdon. These introductions were strongly criticized by R. Ll. Praeger (35) and W. Watson (54), and were commented on in the daily papers. Letters from Mr. Bulley preserved at Kew add the following details—the seed of 240 kinds of alpine plants was sown on Snowdon on a steep slope under the Parson's Nose and well out of the way of the public, many seedlings appeared the first year, but denudation of the steep slope assisted by the trampling of sheep worked havoc and presently it appeared that everything had been destroyed. In 1937, 1938 and 1939 the site was examined by Mr. Hope, Mr. Bulley's gardener, who found thousands of seedlings of *Primula sikkimensis*, *P. floribunda* and *P. chionantha* but no flowering plants. This example, although its sheds no direct light on the status of *Artemisia norvegica*, shows that some alien alpine plants sown in a somewhat comparable habitat may persist for many years. Little information seems to have been published about the Scottish introductions referred to above. Prof. I. Bayley Balfour died in 1922, and possibly little came of this scheme. Patton in 1923 (34) however, mentions that " Professor J. H. [I. B.?] Balfour planted seeds of *Phyllodoce coerulea* on the Sow of Athole, and he adds, in his description, that there may have been some seeds of *P. empetrifolium* among them. The native plant was at that time showing signs of being greatly reduced in numbers. Again, J. Sadler planted

Eriophorum alpinum in Glen Dole—but it no longer grows there. These are but two examples ".

There is no mention of *Artemisia norvegica*, *Diapensia lapponica* or *Koenigia islandica* in the literature quoted in the last paragraph.

The arguments for and against *Artemisia norvegica* being a native are much the same as for *Diapensia lapponica*. The number of individual plants observed of each suggests that the species has been there for some time, and none of the collectors' field observations suggest that the species are aliens. On the other hand the possibility of its having been deliberately planted and no record kept (and such things have happened) is very difficult to disprove.

References

1. Anon. ; " Some Alpine Plants on Snowdon" in Kew Bull. 319–20 (1921).
2. Anon. ; " *Artemisia norvegica* collected in Scotland " in Gard. Chron. ser. III, **132,** 112 (1952).
3. Bailey, L. H. ; " The Standard Cyclopedia of Horticulture " 1939.
4. Blakelock, R. A. " *Diapensia lapponica* L. ; its occurrence in Scotland" in Kew Bull. **1951,** 325 (1952).
5. Buchanan-White, F. ; " *Myosotis alpestris* in Forfarshire " in Journ. Bot. **14,** 26–27 (1885).
6. Burtt, B. L. ; " *Koenigia islandica* in Britain " in Kew Bull. 266 (1950).
7. Chittenden, F. J. ; " The Royal Horticultural Society's Dictionary of Gardening " 1951.
8. Correvon, H. in L. Marret ; " Icones Florae Alpinae Plantarum " ser. II, fasc. 7, t. 422 (1914).
9. Druce, G. C. ; " The Dubious Plants of Britain " in B. E. C. Report **5,** 738–799 (1919).
10. —— " The Life and Work of George Don " in Notes Roy. Bot. Gard. Edinb. **3,** 53–290 (1904–5).
11. —— " *Aquilegia alpina* L. Native ? ?" in B.E.C. Report **4,** 399 (1917).
12. —— " The Flora of West Ross " in Suppl. Rep. B.E.C. 1929.
13. Fries, T. M. ; " Strödda Underrattelser " in Bot. Notis. 104 (1857).
14. Good, R. ; " The Geography of the Flowering Plants " 1947.
15. Haglund, E. ; " Några bidrag till den skandinaviska fjällflorans spridningsbiologi " in Bot. Notis. 262–275 (1901).
16. Hall, H. M. and F. E. Clements ; " The Phylogenetic Method in Taxonomy : The North American Species of *Artemisia*, *Chrysothamnus* and *Atriplex* " pp. 46–47, 57–65 (1937).
17. Harrington, H. D. ; " Results of a seeding experiment at high altitudes in the Rocky Mountain National Park " in Ecology **27,** 375–377 (1946).

18. Hultén, E. ; " Outline of the History of Arctic and Boreal Biota during the Quaternary Period " p. 94, 96 (1937).

19. Hultén, E. " Flora of Kamtchatka and the Adjacent Islands " in Kungl. Svensk. Vetensk. Handlin. **4,** 176–188 (1930).

20. —— " The Flora of the Aleutian Islands " p. 325–326 (1937).

21. —— " Flora of Alaska and Yukon " in Lunds Univ. Arssk. N.F. **46,** 1553–1568 (1950).

22. —— " Atlas of the Distribution of Vascular Plants in N.W. Europe " map 1725 (1950).

23. Jepson, W. L. ; " A Manual of the Flowering Plants of California " pp. 1139, 1141 (1925).

24. Koidzumi, G. ; " Contributions ad floram Asiae Orientalis " in Bot. Mag. Tokyo **32,** 58 (1918).

25. Lid, J. ; " Norsk Flora " p. 527 (1944).

26. Lindman, A. ; " Bilder ur Nordens Flora " p. 474, pl. 536 (1926).

27. Lynge, B. in O. Holtedahl ; " Report of the Scientific Results of the Norwegian Expedition to Novaya Zemlya 1921 " 1928.

28. Matthews, J. R. ; " Geographical Relationships of the British Flora " **25,** 1–90 (1937).

29. Nordhagen, R. ; " Bredemte sjøer i Sunndalsfjellene " in Norsk Geografisk Tiddskrift **2,** hefte 5–6, 281–356 (1929) [a copy on loan from Prof. Nordhagen].

30. —— " Nye Iattagelser over de bredemte sjøer i Sunndalsfjellene " in Norsk Geografisk Tiddskrift **3,** 34–55 (1930).

31.—— " De Senkvartaere klimavelkslinger i Nordeuropa og deres detyding for kulturforskningen " : Instituttet for Sammenlignende Kutturforskning ", 1933. [a copy on loan from Prof. Nordhagen]

32. —— " Skandinavias fjellflora og dens Relasjoner til den Siste Istid " in Nordiska (19. skandinaviska) naturforskarm ötet i Helsingfors, 93–124 (1936).

33. —— " Norsk Flora " p. 662 (1940).

34. Patton, D. ; " Variations in the Vegetation along the Outcrop of the Lawers-Caenlochan Schist " in B.E.C. Report **6,** 797 807 (1923).

35. Praeger, R. Lloyd ; " A Defiled Sanctuary " in Journ. Bot. **59,** 354 (1921).

36. Polunin, N. ; " Botany of the Canadian Eastern Arctic " part 1, 1940.

37. Nannfeldt, J. A. ; " Taxonomical and Plant-Geographical Studies in the *Poa laxa* group " in Symb. Bot. Upsal. **5,** 1–113 (1935).

38. —— " On the Polymorphy of *Poa arctica* R. Br. with special reference to its Scandinavian forms " in l.c. **4,** 1–85 (1940).

39. Porsild, A. E. ; " Vascular plants collected on Kiska and Great Sitkin Islands in the Aleutians by Lt. H. R. McCarthy on Copl. N. Kellas, Aug. Sept. and Oct. 1943 " in Canadian Field-Nat. **58,** 130–131 (1944).

40. Raven, J. E. ; " Alien Plant Introductions on the Isle of Rhum " in Nature **163,** 104–105 (1949).

41. Reichenbach, H. G. L. ; " Iconographia Botanica seu Plantae Criticae " **1,** t. 89 (1823).

42. Ribbons, B. W. ; " *Homogyne alpina* in Scotland " in Watsonia **2,** 237–238 (1952).

43. Roger, J. G., " *Diapensia lapponica* L. in Scotland " in Trans. Bot. Soc. Edinb. **36,** 34–36 (1952).

44. Rydberg, P. A. ; " North American Flora " **34,** 260 265 (1916).

45. —— " Flora of the Rocky Mountains and Adjacent Plains ". pp. 963, 967–8 (1917).

46. Salisbury, E. J. and others ; " Discussion on the Origin and Relationship of the British Flora " in Proc. Roy. Soc. **118,** 197 241 (1935).

47. Skalinska, M. ; " The Problem of Indigenity of a Scottish *Aquilegia* " in Journ. Bot. **78,** 39–45 (1940).

48. Straka, H. ; " Zur Feinmorphologie des Pollens von *Salix* und von *Artemisia* " in Svensk Bot. Tidskrift. **46,** 204–227 (1952).

49. Takeda, H. ; " Alpine Flowers of Japan " pl. 45 (1938).

50. Tansley, A. G. ; " The British Islands and their Vegetation " 1949.

51. Turrill, W. B. ; " The Flora of St. Kilda " in B.E.C. Report 428–444 (1928).

52. —— " The Flora of Foula " in l.c. 838–850 (1929).

53. —— " British Plant Life " 1948.

54. Watson, W. ; " A defiled Sanctuary " in Journ. Bot. **60,** 57 (1922).

55. Wille, N. ; " Fredning af sjeldne Plantearter paa Dovre (Norge) " [Protection of rare plant species on Dovre Norway] in Bot. Notis. 143–144 (1912).

56. Willmott, A. J. and others ; " Discussion on the Origin and Relationship of the British Flora " in Proc. Roy. Soc. **118,** 197–241 (1935).

57. —— " Concerning the History of the British Flora " Soc. de Biogeogr. **3,** 163–193 (1930).

The Tropical Rain Forest.*—To botanists coming from temperate lands the rain-forest has probably always been one of the most impressively fascinating and wonderful of the new types of vegetation that they encountered in the tropics. Formerly our knowledge of rain-forest was derived almost entirely from the picturesque and gaudily painted but subjective and too often inaccurate accounts brought back by explorers and savants intrepid enough, at the risk of health and often life itself, to penetrate the unknown. Only in comparatively recent years has it been scrutinised by scientists trained in the discipline of ecology, and a wealth of scattered literature, often valuable and precise, has now accumulated.

*The Tropical Rain Forest, by Professor P. W. Richards. Pp. xviii + 450 ; 15 plates. Cambridge, at the University Press, 1952. Price £3 3s. 0d.

Although so much is still unknown, the time has come for the pieces of this jigsaw to be collected and built together, and the task has fallen to Professor P. W. Richards, than whom surely no one is more highly qualified for it. For this book is not merely a compilation, but is the fruit of unique personal experience and research in the rain-forests of three continents.

Although rain-forest is so widely distributed and extensive in the equatorial regions, wherever it occurs it shows numerous common features of general appearance, of structure, of composition, of regeneration and succession, of climate, and of the morphological peculiarities of the plants that form the forest. Professor Richards has wisely and interestingly focussed attention on these general tendencies that together characterise the formation-type, showing what they are and how they repeat themselves in different parts of the world, at the same time showing how they vary. Surprisingly little information seems to have been accumulated about the ecology of the Brazilian forests, the largest and surely among the most wonderful in the world.

It has been a vexed question in the past of what to include under rain-forest, whether to limit strictly its definition, or whether to include such concepts as evergreen seasonal forest, mixed deciduous forest, etc. ; Professor Richards, cutting this knot, considers them to come within his definition of rain-forest, to be reflections of climatic differences, and to pass almost imperceptibly one into the other.

The book is necessarily written from the ecologists' point of view and the breadth of outlook is refreshingly different from the purely floristic studies that have been made. Long species-lists, informative and valuable, but dry reading, are here eschewed. The intelligent taxonomist will find nevertheless more things to interest him than I can mention, particularly the morphological matter in Part I, and Part III dealing with the Floristic Composition of Climax Communities.

Enough has been said here to indicate the wide scope of this book. Its style is throughout one of calm unruffled judiciousness, quietly presenting the evidence, and unemotionally assessing it. And if the author's enthusiasm for the forest, of which the reviewer has had personal experience on the spot, is here never allowed to exuberate into those " purple passages " which the author in his introduction deprecates, yet his magisterial style will inspire the greater confidence in the wisdom of his judgments.

The assembling of the information must have been difficult enough, but the arrangement must have been yet more so ; and the reviewer feels that a special tribute should be paid to the masterly way the various topics have been sifted and arranged.

To say that " this book fills a gap " is a well-worn cliché of reviewers, but here it might be said with absolute truth : there has been nothing of its sort before, and it is safe to say that this excellent work will be for botanists, foresters, and all who are concerned with tropical rain-forests a valued storehouse of information and reference for many years to come. I am only sorry that its high price will place it beyond the reach of many.

J. P. M. Brenan.

A new edition of Ruiz's Relación Histórica*.—It was in 1931 that the Madrid Royal Academy of Sciences published for the first time the text of Ruiz's manuscript account of his travels with Pavón and Dombey in Peru and Chile between 1777 and 1788, on the first of the three great expeditions sent out by Carlos III to study the natural history of the New World. The text was edited and annotated with an epilogue and numerous appendices by its discoverer, Father Agustín Barreiro, who with great ingenuity and pertinacity had traced it to the small town of Aravaca, north-west of Madrid. Previously, only brief outlines of their travels had been given by Ruiz and Pavón in their " Quinologia " and " Prodromus Florae Peruvianae et Chilensis ". The publication, then, after almost a century and a half, of the full details of their itinerary and herborisations, as prepared by Ruiz from his diaries, was an exciting event for students of the flora of South America. A few years later, in 1940, an English translation, by B. E. Dahlgren, of what we may call the Barreiro text and appendices was published by the Field Museum of Natural History, Chicago.

Father Barreiro was fully aware that the manuscript he had edited was only a rough draft, because of the numerous corrections, the careless spelling and punctuation, and the abrupt omission of the descriptions of the cities of Lima and Huánuco. He was convinced that a final, fair copy must exist, and he had a clue to its whereabouts and possessor (" la persona de quien nos dijeron que debía poseerla "), but relates that his approaches met with a rude rebuff through a third party (no names are mentioned by him). Father Barreiro died in Madrid in 1937, in the middle of the Spanish Civil War, in the Norwegian Embassy where he had taken refuge.

Meanwhile, for more than a century, two vital manuscript drafts of this very work of Ruiz had been lying unstudied in England. They had come into the possession of Aylmer Bourke Lambert, together with other manuscripts and thousands of dried specimens from Ruiz and Pavón's collections (the latter, at least, as is proved by the evidence of lists at the British Museum and of letters preserved at Kew, he had purchased from Pavón), and on Lambert's death they had been acquired by the British Museum after the famous auction sale of his botanical collections held by Sotheby on June 27th, 1842. Thus it came about that two manuscripts of Ruiz's " Relación Histórica ", in his own handwriting, were available in the Botanical Department of the British Museum (Natural History) when Dr. Jaime Jaramillo-Arango, former Colombian Ambassador in London, was working there recently on his investigation of the history of *Cinchona*. It was indeed a stroke of good fortune that at last they came into the hands of so distinguished a scholar and enthusiast, who at once

*Relación histórica del viage, que hizo a los Reynos del Perú y Chile el botánico Dn. Hipólito Ruiz en el año 1777 hasta el de 1788, en cuya época regresó a Madrid. Published for the first time by the Comisión de Estudios retrospectivos de Historia Natural de la Real Academia de Ciencias Exactas, Físicas y Naturales de Madrid, based on the Manuscript discovered and revised by Father A. J. Barreiro, O.S.A., Madrid, 1931. Second edition, emended and completed with the addition of all that was missing in accordance with the definitive, unpublished copy of the Manuscript of Don Hipólito discovered and copied in the Department of Botany of the British Museum (Natural History), by Dr. Jaime Jaramillo-Arango. Published by the Real Academia de Ciencias Exactas, Físicas y Naturales de Madrid, 1952. Vol. i. pp. xliv, 526. Vol. ii. pp. 244, 20 pls., 2 maps and portr. 66 special copies, of which that under review is numbered 35.

recognized their value and was eager to devote his experience and ability to their interpretation. The result of his work is the magnificent volumes now before us of which he is editor and which, through his generosity, have again been published at Madrid, under the auspices of the Royal Academy of Sciences.

In his interesting introduction Dr. Jaramillo-Arango classifies the three known manuscripts of Ruiz's " Relación Histórica ". The Barreiro text was based on a rough draft worked up by Ruiz while he was still in Peru and during his voyage home. Of the British Museum manuscripts, the first is a complete copy of the travels, but still a rough one, with many corrections and annotations. This was based on the Barreiro manuscript after Ruiz had returned to Spain and was finished by him about 1793, the original first word of the title at the top of the first sheet being " Compendio " (but this word has been deleted and Ruiz has substituted " Relacion " in the margin, see vol. ii, pl. 1 of this edition). The second manuscript, which is shorter, is a fair but incomplete copy and represents a final revision (after further corrections and additions) of the first one begun after 1801. Thus the 75 sheets of this final draft cover only the first 57 of the 88 sheets of the complete one. Accordingly, in his new edition of the complete text, Dr. Jaramillo-Arango has used the whole of the final but incomplete draft for the first two thirds of the work, while the remainder is transcribed from the rough but complete British Museum copy. The publication of this text gives us not only the descriptions of Lima and Huánuco, which were missing from Barreiro's copy, but also other new chapters and many further valuable data and descriptions of plants.

The editor assesses Ruiz's character and capacities, and also gives useful accounts of the two other great expeditions of this period, to Colombia and Mexico, the first led by Mutis, the second by Sessé and Moziño. At the end of the " Relación " he has reprinted Barreiro's Appendices and Epilogue, regrouping the former in chronological order and giving each of them an explanatory title (they have become 36 in number, instead of 27). His second volume begins with a fine series of plates, among them reproductions of the first pages of each of the two British Museum manuscripts of the " Relación ", and beautiful copies of 18th century Spanish maps of Peru in the possession of that institution ; while its second half is composed of eleven admirably classified Indexes which include one of more than 350 Latin binomials of plants not mentioned in the Barreiro text, another of Indian names of medicinal plants with notes on their uses, and an impressive bibliography of works consulted by the editor.

There can be nothing but praise for Dr. Jaramillo-Arango's bringing to the light of publication these neglected* manuscripts of Ruiz, and his superb presentation of them earns the gratitude of all those who pursue Hispanic studies. A few questions arose in the mind of the reviewer as he read the introduction. May not the words *halló, el hallazgo nuestro* (" he discovered ", " our discovery "), when used of the editor's finding

*Not quite neglected. The manuscripts are bound together in a handsome volume and, as stated in the British Museum Catalogue, there is the beginning of an English translation bound in at the end. There is no evidence of the translator's identity ; perhaps it was Lambert's translator, Hatcher, see below.

of the British Museum manuscripts, be a little misleading, especially for Spanish readers? Dr. Jaramillo-Arango's " discovery " is in no way comparable to that of Father Barreiro, since these two manuscripts were clearly (though not quite accurately) listed in the Catalogue of the Library of the British Museum (Natural History), vol. 4, p. 1765, as long ago as 1913, a fact which is never stated in the present edition. It is only fair to Dr. Dahlgren to add that he did transcribe the data from this Catalogue, with the reference, at the foot of the page of Errata preceding the Table of Contents of his translation. And when Dr. Jaramillo-Arango writes (vol. i, p. xxv., reviewer's translation), " If the difficulties encountered by Father Barreiro in the pursuit of his aim of finding the fair copy had been of a different character, would the distinguished member of the Spanish Academy have fulfilled his undertaking? We cannot say.", one is left wondering whether he supposes that Barreiro had or had not seen the British Museum Catalogue, whether the rude rebuff he received came from a Spanish or a British source, and whether the implication is (or is not) that another fair copy still exists in Spain. One thing is certain, that Barreiro knew perfectly well that several of Ruiz's manuscripts were in the possession of the British Museum and suspected that Pavón had transferred them to Lambert (see Epilogue no. viii. footn. 4 of last page, Dahlgren transl. p. 270 ; this ed., i. p. 517). Incidentally, Dr. Jaramillo-Arango calls the first, complete, British Museum manuscript " El Compendio ", but this is surely not quite happy since, as pointed out above, the original first word of the title is deleted and " Relación " is substituted in the margin : the Catalogue itself does not use the word " Compendio ".

In discussing the question of how and when Lambert obtained these manuscripts, the editor does not mention (nor cite in his bibliography) that interesting little work, the " Elógio Histórico ", a biography of Ruiz by his son, Antonio Ruiz, which was first published in Madrid in 1821* and was translated into English by Mr. Hatcher, of Salisbury, Lambert being the editor. Copies of both the original and the translation, which was published by W. R. Brodie and Co. at Salisbury in 1831, are at the British Museum (Natural History) and are catalogued on the same page as the manuscripts of the " Relación ". Lambert remarks in his preface to the translation, " The entire Herbarium of M. Ruiz [*sic* !†], comprising many thousands of dried plants, collected in Peru and Chile, *together with his personal narrative* [reviewer's italics], and several volumes of ms. descriptions and observations of the plants and animals of those countries, the whole evincing an acute and industrious observer, are now in the possession of the Editor ". The copies of the

*I can find no evidence that, in Lambert's words in the Preface, it was " printed only in 1815," i.e., a year before Ruiz's death. Antonio Ruiz's " Prólogo " to the 1821 version makes no reference to any earlier edition, and I suspect that Colmeiro (" La Botánica y los Botánicos de la Península Hispano-Lusitana ", p. 104, 1858) had not himself seen any such edition but was accepting Lambert's remark. These words of Lambert have probably given rise to the statement in the British Museum Catalogue, " The Elogio first appeared in 1815 ".

†In Pavón's letters to Lambert, preserved at Kew, there is no mention whatever, either of Ruiz, or his Herbarium, or his mss. In a letter dated May 25th, 1820, Pavón indicated to Lambert that he would give him the first offer for his own (Pavón's) herbarium. Soon after this, business relations between the two men became strained and there is a mysterious gap in the correspondence between August 21st, 1820, and September 23rd, 1824. Can it be that a whole series of important letters is missing, at any rate from this collection?

" Relación ", then, were in the hands of Lambert by 1831. Ruiz himself had died in 1816.

This " Elógio " is the subject of a valuable recent paper by Dr. Léon Croizat, entitled " Une biographie peu connue de Hipólito Ruiz ", which was published in *Lilloa*, vol. 18, pp. 295–329 (1949), after being read at a session of the Second South American Botanical Congress at Tucumán, on October 13th, 1948. After describing the " Elógio " and the new light it throws on the inside history of the publication of the " Flora Peruviana et Chilensis ", Dr. Croizat prints the entire Spanish text of the original, which was incorporated with and preceded a second, enlarged, edition by Antonio Ruiz of his father's " Memoria sobre el *Smilax* (China Peruviana)." As Dr. Croizat points out, the " Elógio " gives a summary of Ruiz's travels and partly fills at least one of the lacunae in the Barreiro text : for instance, there are brief abstracts from the description of the town of Huánuco. It is therefore clear that Antonio Ruiz had access to a fair copy of the " Relación " before 1821, and that this copy could not have left Spain until after that date.

It may be noted, finally, that Sotheby's printed Catalogue of the Sale of Lambert's " Botanical Museum ", when describing the inclusion of this famous manuscript in Lot 103, headed " Ruiz and Pavon's magnificent herbarium ", ran as follows : " also a Box containing about 30 specimens of Cinchona and other Barks, and the original Manuscript, *which came into Mr. Lambert's possession at the same time* [reviewer's italics]", etc., etc. The suspicion grows that the " Relación " was sold by Pavón to Lambert after Ruiz's death.

N. Y. Sandwith

AN INTERESTING FORM OF FRULLANIA TAMARISCI (L.) DUM.

Jane Taylor

Recently when exploring a coastal dune stretch at Magilligan, County Derry, V.-C. (H.40) a *Frullania* growing profusely on old heather was collected, by Miss E. M. Lobley, Miss R. Gray and the writer. Subsequent microscopic examination showed it to be an interesting form of *F. tamarisci* (L.) Dum. The recognised varieties of this species are based on the degree of variation in the following characters—

1. Colour and Size.
2. Antical lobe shape.
3. Postical lobe shape.
4. Underleaf variability.

Scoring on these characters, the affinities of the Magilligan gathering lie with *F. tamarisci* var. *tamarisci* and its variety *atrovirens* as shown in the following table—

F. tamarisci var. *tamarisci*	Magilligan Gathering.	*F. tamarisci* var. *atrovirens*

1. Red-brown (rarely dark green).	Red-brown also green and plants with both colours intergrading on the same stem.	Indigo-green or red-brown.
2. orbicular-ovate, deeply cordate at base ; apiculate or acute.	elliptic-ovate ; some lobes markedly apiculate others merely acute.	elliptic-ovate ; apiculate or acute (markedly apiculate in authentic material.)
3. oblong-cylindrical.	red-brown portions of stems with oblong-cylindric, green portions with markedly explanate lobes.	frequently explanate.
4. large ; margin revolute for $\frac{2}{3}$ length.	every gradation of reflexion from slight to strong.	large; margin slightly reflexed.

The supposed characters for the var. *atrovirens* have been taken from the descriptions of Carrington (1), Müller (2) and Macvicar (3) and from examination of authentic material in the Kew Herbarium. The Magilligan plant demonstrates a good example of an intermediate form and hence suggests that *atrovirens* must be regarded as a habitat form and indeed the varying emphasis placed by the different authorities on different characters may be taken as supporting this view.

Jones (4) has pointed out, in his valuable account of advances in the knowledge of British hepatics, that it is now generally agreed that habitat modifications do not deserve the rank of variety. The so-called variety *atrovirens* is undoubtedly a habitat form of *F. tamarisci* adapted to shady humid conditions and as such must relinquish its status as a variety.

The synonymy of *Frullania tamarisci* (L.) Dum. may now be extended to include—

Frullania tamarisci var. *atrovirens* Carrington, Trans. Bot. Soc. Ed. p.457 (1863).

Frullania tamarisci var. *blanda* de Notaris, Mem. Accad. Torino Ser. II Bd. 22. p. 378 (1865).

Frullania tamarisci var. *heterophylla* Corbière, Muscinées de la Manche p. 345 (1889).

Frullania tamarisci var. *explanata* Kaalaas de Distribut. Hepat. in Norvegia p. 97 (1893).

I wish to express my thanks to Dr. P. Greig-Smith for examining this plant and confirming my decision.

References :

1. Carrington, B. Irish Hepaticae. Trans. Bot. Soc. Ed. 457 (1863).
2. Müller, K. Die Lebermoose. (L. Rabenhorst's Kryptogamen-Flora von Deutschland, Oesterreich und der Schweiz, VI Band.) 613 (1912–1916).
3. Macvicar, S. M. The Student's Handbook of British Hepatics. 448–451 (1926).
4. Jones, E. W. Advances in the Knowledge of British Hepatics since 1926. Trans. B.B.S. 2, pt. 1, 1–9 (1952).